DOCUMENT RESUME

ED 393 245 EC 304 689

AUTHOR Edyburn, Dave L.; And Others
TITLE The View Finder: International Perspectives on Special Education Technology. Volume 3.
INSTITUTION Council for Exceptional Children, Reston, VA. Div. of International Special Education and Services.; Council for Exceptional Children, Reston, VA. Technology and Media Div.
PUB DATE 95
NOTE 51p.; For Volume 2, see ED 366 155.
PUB TYPE Collected Works - General (020)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Accessibility (for Disabled); Augmentative and Alternative Communication; *Comparative Education; *Computer Assisted Instruction; Cultural Differences; Cultural Influences; *Disabilities; *Educational Technology; Elementary Secondary Education; Foreign Countries; Interpersonal Competence; Man Machine Systems; Mild Disabilities; National Surveys; *Special Education; Special Education Teachers; Special Needs Students; *Technological Advancement
IDENTIFIERS Canada; Indonesia; Israel; Scotland

ABSTRACT

The four articles in this monograph present issues in the application of technology to special education from an international perspective. In the first chapter, "Augmentative and Alternative Communication Systems--Computer Applications for Individuals with Disabilities: An International Perspective," Richard Cardinali and George McMurdo provide a comparative review of the developments in technology-based communication systems in the United States and Scotland (United Kingdom). They argue that use of augmentative and alternative communication is currently limited due to a lack of role models, a lack of vision, and insufficient training. The second article is titled "Computer Applications for Special Needs Students: What Canadian Teachers Use and Need," by C. Laine and others. This paper reports the results of a national survey of Canadian special education teachers on special education technology including such issues as access, use, and unmet needs. The third paper is "Technology and Social Skills Training Program for Students with Special Needs in Israel: 'I Found a Solution,'" by Malka Margalit. This paper reports on five studies of students with mild disabilities who used a computer-assisted social skills program called "I Found a Solution." It suggests such programs may have tremendous value in enabling students to experiment and rehearse solutions for social conflicts. The final paper is "The Indonesian System of Caring: Beyond Technology Solutions to Human Problems" by Judy W. Kugleman. It raises questions concerning unanticipated outcomes that may arise from over-reliance on technology and the dangers of assumptions about shared beliefs and values in multicultural societies. (Papers contain references.) (DB)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 393 245

Volume Three DISES 1995

THE VIEW FINDER: International Perspectives on Special Education Technology

Dave L. Edyburn
Robert A. Henderson
Lauran Sandals

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

A Joint Publication of

DISES
Division of International Special Education and Services

TAM
Technology and Media Division

The Council for Exceptional Children

EC304689

Volume Three DISES 1995

THE VIEW FINDER: International Perspectives on Special Education Technology

Dave L. Edyburn
Robert A. Henderson
Lauran Sandals

A Joint Publication of

DISES
Division of International Special Education and Services

TAM
Technology and Media Division

© 1995
The Council for Exceptional Children
1920 Association Drive
Reston, VA 22091-1589

International Perspectives on Special Education Technology

Table of Contents

Editor's Introduction 1
Dave Edyburn, Bob Henderson, and Lauran Sandals

Augmentative and Alternative Communication Systems—Computer Applications for Individuals with Disabilities: An International Perspective 3
Richard Cardinali & George McMurdo

Computer Applications for Special Needs Students: What Canadian Teachers Use and Need 13
C. Laine, L. Sandals, & J. Hughes

Technology and Social Skills Training Program for Students with Special Needs in Israel: "I found a solution." 23
Malka Margalit

The Indonesian System of Caring: Beyond Technology Solutions to Human Problems 37
Judy W. Kugleman

Editor's Introduction

Dave L. Edyburn
University of Wisconsin-Milwaukee

Robert A. Henderson
University of Illinois at Champaign-Urbana

Lauran Sandals
University of Calgary

When the Division of International Special Education and Services (DISES) was formed as a CEC division in 1990, one of the purposes was toprovide its members with greater access to worldwide developments in this field by means of a monograph series. Volumes One and Two were entitled, "The View Finder: Expanding Boundaries and Perspectives in Special Education" and were edited by Robert J. Michael of SUNY-New Paltz, New York and Graham Upton, Dean of the Faculty of the University of Birmingham, UK.

In 1994, one of DISES' founding officers, Lauran Sandals of the University of Alberta proposed that DISES join with the Division of Technology and Media (TAM) to explore the rapidly expanding world of technology in proving special education programs and services in various countries throughout the globe. The Executive Committees of both divisionsagreed to a joint publication, and appointed Lauran Sandals (DISES) and Dave Edyburn (TAM) as co-editors. Manuscripts were solicited and despite numerous obstacles and delays, the monograph has become a reality. The editors thank the authors for their patience, and hope the results will prove to be well worth the wait.

The term, "technology" means very different things to educators in various parts of the world. To some it is the introduction of radio and television programs to supplement meager offerings, while to others, it is the ability to share computer-based audio and visual programming with colleagues in countries on the other side of the globe. With the rapid expansion of communication by means of computers and modems, the Internet now enables educators to share ideas and information across national boundaries nearly instantaneously. New developments promise enhanced capabilities at lower costs, so that soon, even the poorest third-world country should be able to have at least one point of contact with the international special education community via e-mail. Similarly, as microtechnology advances, applications to specific needs of individuals with disabilities offers promise of a improved quality of life for many. The chapters in this monograph offer some insight into where we are at this point, and the issues that are likely to challenge us in the future.

In the first chapter, Richard Cardinali and George McMurdo provide an overview of augmentative and alternative communication (AAC) systems. Recognizing the critical importance of communication for all people, they offer a comparative review of the developments in technology-based communication systems in the United States and Scotland. Their experiences in two Scottish schools and an American augmentative communication facility lead them to believe that AAC has yet to reach its potential. Among the reasons they identify are limits related to a lack of role models, a lack of vision about what can be achieved, and insufficient training.

The second chapter describes the results of a survey of special education teachers in the five Canadian Providences. Laine, Sandals, and Hughes describe the methodology and results of the first national survey on special education technology in their country. After profiling a number of issues involved in access, use, and unmet needs, they provide an extensive discussion of the implications of this research. While this work captures a time-bound snapshot of one country's development, readers will appreciate the international relevance of this issues raised in this study.

In the third chapter, Malka Margalit reports on a programmatic line of inquiry examining the development and implementation of a technology-based social skills training program for students with special needs in Israel. Five studies are presented regarding the use of a computer-assisted social skills program, "I Found a Solution" developed at Tel Aviv University. The studies, conducted with students with mild disabilities, provide impressive evidence concerning the potential value of using the computer to enable students to experiment and rehearse solutions for social conflicts and effectively promote mastery of effective strategies.

The final chapter, by Judy W. Kugleman, is a provocative piece that raises a number of questions concerning unanticipated outcomes that may arise from the over-reliance on technology. Reflecting on her work in Indonesia on a Fellowship through the World Rehabilitation Fund, Kugleman offers a message that is frequently lost among the louder pro-technology voices. Kugleman provides a cautionary footnote to our unbounded optimism as she advances a thoughtful discussion on how to avoid mistaken assumptions about shared beliefs and values when working in multi-cultural societies. This chapter should be required reading by anyone interested in special education technology.

As with any printed document concerning technology, the information is dated before it is printed. However, we hope this document will serve as a benchmark concerning our efforts to improve services to students with special needs. Clearly, recent developments concerning the Internet have the potential to link researchers and practioners from around the world to dialogue about our work. The authors and editors of this monograph look forward to participating in this dialogue with the readers.

Augmentative and Alternative Communication Systems--Computer Applications For Individuals with Disabilities: An International Perspective

Richard Cardinali
Central Connecticut State University
New Britain, Connecticut, USA

George McMurdo
Queen Margaret College
Edinburgh, Scotland

ABSTRACT

A person with severe disabilities may encounter many difficulties and limitations in their daily lives. They cannot speak, or write, but many can understand. Children with severe disabilities comprise the greatest portion of nonspeaking individuals among the school-aged population. This places severe communication restrictions as well as frustrations unknown to the general population. These children often rely on idiosyncratic, nonconventional, and highly ambiguous modes of communication in order to convey their most basic wants and needs. For example, what most people easily communicate can be a struggle for an indivdidual with a disability. For example, communicating "I am hungry." or "I am sick." pose an incredible struggle. Augmentative and Alternative Communication (AAC) aids play a major role in overcoming some of these communication limitations. AAC in this paper is defined as any aided system which assists spoken communication. It does not include the use of signs or equipment such as amplifiers and hearing aids. This paper explores several areas of augmentative communication its associated technology, and will provide the reader with examples of the use of augmentative and alternative communication technology in the United States and Scotland.

The use of Alternative and Augmentative Communication (AAC) systems, such as communication boards or technological aids, has developed rapidly in the past decade. Rowley et. al. (1988) concluded from their studies of communication aids provision in the U.K. that the level of communication aids provision was not increasing significantly between 1983 and 1985. However, they also commented that it was unwise to assume that all needs were being met. No communication aids with voice output were identified and the aids most frequently provided at that time were Canon Communicators. Many people are now aware of the possible benefits or AAC systems for people who have little or no useful speech.

To date, however, there is a dearth of information concerning the incidence and prevalence of problems of communication of people with little or no useful speech and it is not known how many people could be helped by AAC systems. Moreover, information about the incidence of severe communication impairment and about the needs of the people affected by it is fundamental for the planning of service provision, and for the training of speech and language therapists and others involved in their care. In addition, such information is important for

those involved in the research and development of AAC systems.

Defining Disability

To analyze the effects of augmentative and alternative communication on persons with disabilities, some insights are required as to the different types of handicaps. This will assist in understanding why people have relied on the computer technology to help individuals with disabilities communicate and learn in today's society.

The term disability is generally used to describe people who have a physical, sensory, or mental disability that inhibits them from functioning like the general population in their daily activities. The different types of physical handicaps include blindness, deformity, muscular disorders, deafness, paralysis, loss of limbs or nervous disorders. Additionally there are two types of mental disabilities which disable people; they are mental illness and mental retardation.

Some people are born with a disability, like muscular and nervous disorders, deafness and mental retardation. Disability may also result from disease, accidents or war. About 35 million people in the United States or roughly 14% of the population have a disability. In the United Kingdom (including Scotland) studies by Enderby and Phillipp (1986) estimated that about 2.3 million people in the U.K. had various forms of speech and language disorders connected with medical and/or developmental conditions. Of these people, it is estimated that 800,000 have a severe communication disorder, i.e., have difficulty in making themselves understood by anyone other than the immediate family. Therefore, it is imperative that society become more aware of the needs of individuals with disabilities.

Education

Education serves a critical function for all people. If an individual is born with or develops a disability at an early age, then helping to educate them normally starts in the home with their parents. This may present both financial and emotional problems. A parent who is unable to work with the child may have them placed in a specialized school, that is, in an environment which is better equipped to handle and teach the child. These educational costs vary but normally are according to the child's disability. There is also an emotional strain. The emotional strain has driven families apart because of the parent's feelings of not being able to provide proper care. Education at this point becomes a two fold problem. The first problem lies in trying to teach the individual with a disability, the second concerns those not disabled. They must try to understand the stress involved on how the child needs to function in order to learn or often, and how equally stressful it will be for them to prepare and care for the person during the learning process.

While children with severe disabilities challenge the creativity of practitioners whose goal is to maximize the child's development of functional communication skills, the continuing emphasis in both countries (U.S. & U.K.) is on integrating these children within regular education (and/or least restrictive environments) to the greatest extent possible. Like most children, those with severe disabilities spend the majority of the day and week in school related activities. The extent to which augmentative and alternative communication instruction is in effect must therefore be evaluated relative to improvements in students abilities to meet the academic and social demands of the school. Facilities such as the Newington Augmentative Center in Newington, Connecticut have the staff and the technology to provide specialized teaching interventions to assist students with severe disabilities in communicating.

Communication

A number of children as well as adults, are unable to communicate verbally or in writing, yet they can hear and comprehend speech. There are several communication intervention programs and descriptions of specific teaching procedures which would be appropriate for individuals who demonstrate limited cognitive skills. For example, the inability to speak may be a result of some physical limitation caused by cerebral palsy, head trauma, stroke or some other neurological impairment such as multiple sclerosis or Parkinson's disease.

Today, computer technology has become an important tool for assisting individuals with severe disabilities to communicate. Compensatory augmentative communication technology is the use of computers and related technology to augment, or enhance, the verbal and written functioning of individuals. Compensatory augmentative communication technology focused on the interactive capabilities of the computer, particularly the ability of the computer to provide alternative means of expression and communication.

The use of augmentative and alternative communication systems with individuals who are unable to speak or write has increased steadily over the past ten years

(Locke & Mirenda, 1988). In a demographic study of university students using AAC in the USA, Blake-Huer (1991) identified that the disabilities relating to communication impairments most frequently represented in the student body on university campuses were: cerebral palsy, reported by 82.7% of the campuses included in her study; multiple sclerosis, 67.3%; closed head injury, 62.2%; muscular dystrophy, 52%; and shock trauma/surgery were reported on 51% of campuses. Although it is likely that people with cerebral palsy form the largest group of AAC system users, prior to the present research no data have been available in Scotland providing estimates of the number of users of AAC systems with cerebral palsy. Persons with cognitive limitations who experience physical limitations resulting from accidents or disease are prime candidates to use and benefit from such communication technology. This methodology is adaptable because the dynamic characteristics of the computer make an ideal extension of the traditional instructional methods used in special education. The computer is capable of enhancing a disabled person's ability to communicate as well as compensating for other physical deficiencies. The use of the computer allows both the individual with a disability and the teacher to focus attention on what the person can do rather than what cannot be done due to physical limitations.

Access to Technology

The key characteristic of the computer in this environment is its ability as an interactive medium. Media such as television and radio are passive in nature, whereas the computer will not respond unless an action or command is initiated. However, initiating this action is not limited to typing the correct key. Because of physical limitations, a person may have extremely limited muscular ability, and must rely on the use of a specialized switch to interact with the machine.

Switches

Input of information into the computer through the use of switches is simplified so that a single switch or prosthetic device connected to the switch allows an individual with a disability to control the computer. Switch systems can utilize mechanical, pneumatic or electrical switches to operate the computer rather than the normal keyboard. These on-off or toggle switches capitalize on the limited physical ability the user may possess. Therefore, any form of controlled muscle contraction, such as a brow wrinkle, or an eye twitch, can control the computer. There are a number of switches available. Three popular switches are the paddle switch, rod pad switch and plate switch. Each is easily activated by the user and each provides both auditory and tactile feedback. Additionally these switches can be mounted for activation by most body parts.

Alternative Keyboards

Keyboards are simply a series of electronic switches that when activated, run and control the computer. This methodology focuses on the keyboard as the principle input device in a typewriter format. Alternative keyboards are another type of prosthetic input device that makes the computer accessible to individuals with physical disabilities.

Alternative keyboards function similar to traditional keyboards, however, they have been modified to facilitate physical access. One variation of an adaptive keyboard is one with separated and enlarged keys that permit data entry and control of the computer by individuals with unsteady hand, foot or arm movements.

Another common intervention is a keyguard, a raised cover that goes over the standard keyboard. Keyguards not only assist the individuals with unsteady motor control problems in gaining access to the computer but also assist individuals who must use a pointing device, such as a head or mouth stick/pointer to activate the keys.

Remote keyboards have been developed for individuals with very limited limb control, such as quadriplegics. These units are usually controlled by a "joystick" or by a series of push buttons that can be activated by the head or mouth pointer. These keyboards may be physically detached from the user and operated through the use of infrared ray sensors. These switches are operated by sending out a harmless infrared beam, a movement of a body part that interrupts the beam will activate the electronic switching. Switching can be activated by eye blinks, eyeball movement or movement of body parts.

Speech Synthesizers

Voice or speech output systems are important prosthetic tools for speech impaired individuals. The terms nonvoice, nonverbal or nonspeaker are often used to describe individuals with a speech impairment. These terms can be misleading because they imply that the individual is totally unable to speak. In fact, a very large number of individuals who use augmentative means of communication have partial function speech (Fishman, 1987). Because speech may be unintelligible to unfamiliar persons, voice output systems are utilized as a communications medium.

Voice output systems allow the computer to reproduce relatively human sounding speech either to communicate a program's output or to serve as an adaptive expressive communication device for individuals who have nonverbal or limited verbal skills. The voice output devices, or peripherals, can be located either within the computer itself or as an external attachment depending on the system. In most low-cost systems, the speech is often robotic or computer sounding.

Voice output systems are an expressive communication device for limited verbal and nonverbal individuals. The user enters the message into the computer and when the message is complete, the user commands the machine to "speak." This is also considered a prosthetic application since the computer system is performing the physical task that the disabled user cannot perform.

Computer Assisted Instruction

Teaching students with special education needs requires specialized methods of instruction and supporting augmentative equipment not normally utilized by most students. A common classroom use of computers is Computer Assisted Instruction (CAI). One aspect of CAI is the use of computer technology as a prosthetic tool. The computer enhances the performance of tasks by modifying the input process or the output of information according to the needs of the individual. The technology it uses adjusts instruction rather than directs it. Therefore, the computer can enhance the person's abilities and compensate for deficiencies.

A common use of CAI is the application of word processing which encourages the development of printed material. Word processing allows individuals to focus their attention on the content of what they wish to communicate while letting the computer perform the physical writing process. A word processing system can enhance conceptual and expressive linguistic skills while compensating for sensory or motor deficiencies. In effect, a word processing system can be used to overcome the barrier that exists and inhibits the performance of many individuals with disabilities who cannot write what they wish to express (Cain & Taber, 1987).

Types of CAI Applications

There are five basic types of CAI in use in special education programs. They are tutorial, drill and practice, educational games, discovery learning and simulation. Each application has a different general instructional objective. The needs of the individual are first assessed and are then followed by an appropriate method of instruction.

Tutorial software is designed to assist an individual in acquiring new knowledge and skills through the direct presentation of information. The drill and practice systems are designed to transmit and assist the student in retaining information. Educational games provide entertainment, as well as motivating activities that help the individual practice and previously introduced skill or reinforce newly acquired knowledge and skills. Discovery learning allows the computer to be used as a problem solving tool. Finally, simulation software involves learning by doing or through decision making (Cain & Taber, 1987).

Newington Children's Hospital

In the Speech/Language Pathology Department of the Newington Children's Hospital, Newington, Connecticut, the Augmentative Communication Center encounters a wide variety of communication disabilities. The goal of the center is not only to enable individuals with disabilities to express themselves more effectively but also to aid in the social, emotional and cognitive development of the individual.

The program provides an evaluation of an individual's physical capabilities and language skills, if any, and a recommendation for a suitable communication system and training procedures. Augmentative communication systems range from simple communication aids such as picture boards to more sophisticated electronic devices which include computers (Newington Children's Hospital, PR31R/90).

Clinical Services at Newington Children's Hospital Augmentative Communication Center include:

- Evaluation to determine candidacy for an augmentative communication systems, and evaluation to determine the appropriate system.
- Trial use of augmentative communication systems within the following the evaluation session.
- Recommendation for rental or purchase of a system and/or training protocols.
- Assistance in obtaining funding for augmentative communication systems.
- Training on specific communication systems within the home of school setting when requested.

Professional Services include:

- In-service training programs for professionals in many fields.
- Consultations for school systems and agencies serving the nonspeaking population.
- Resource center for professionals interested in current information on augmentative and alternative communications.

The Scottish View

The authors observed several children with disabilities at the Scottish College for Spastics School in Edinborugh, Scotland. It was noted that a number of children utilized different augmentative communication tools, many were very simplistic devices, this is contrasted to the wide range of computer devices utilized in many United States educational settings.

The simplistic devices include an eye gaze, or display system wherein the observer watches the movement of the child's eye to a specific point on a plexiglass frame. The frame stands upright in front of the individual on the tray of the wheelchair. A piece is cut from the middle of the board through which the observer can look and eye contact can be made. Attached to the outer edges of the board are graphic symbols, as well as photographs of family members and pets, that are meaningful to the child. This system is non-electronic and requires a certain amount of "guess work" on the part of the observer as the individual has limited head control and cannot speak or point. The individual is directed to look at the choice on the board and then look to the observer to signal that a choice has in fact been made. The observer then states the choice detected to that individual can confirm the selection.

Another relatively simplistic system is one that also utilized picture codes. With this system, the child utilizes a switch, to move the cursor to a specific point on the board. The picture board is electronic and has tiny lights below each picture thus allowing the individual's eye to follow the cursor movement and stop at the selected spot via the switch. A Real Voice system allows the chosen words to be "spoken."

These two systems are relatively simple in design, but to the individual who cannot speak or write, they represent an invaluable form of communication. It was noted that the users in this case were children. As the child progresses, the system can be modified, upgraded or changed to enhance the person's communication function.

The most complex augmentative communication device observed at the school involved the use of an IBM system with a voice synthesizer. This system is similar to the system utilized by Stephen Hawking who demonstrated that augmentative communication through computer-based systems is an effective form of communication. Mr. Hawking is an internationally known physicist who lost his ability to speak and control of most his body due to ALS (amyotrophic lateral sclerosis) (Bigge, 1991).

The main menu screen also has common words available such as "this," "and," "will," and "to." Further, word endings are available for ease of use on the main menu screen. For example, "ed" can be added to a word with one "stroke" instead of the two keypresses it would take to produce "e-d".

The phrase function activates a submenu created solely by the subject. Upon completion of the message, the subject activates the speak function, located in the upper left-hand corner of the screen, which "speaks" the word/phrase shown in the work area.

Westerlea School

Westerlea school is an independent establishment which is administered by the Scottish Council for Spastics. It was founded in 1948 and is located on Ellersly Road Corstorphine in the city of Edinburgh. The school caters to pupils aged 3 and 18 years who have physical and mental handicaps as a result of Cerebral Palsy or associated handicapping conditions. The goals of the school are as follows:

- To provide an individual program for each pupil which will include education and therapies, within a secure and positive environment.
- To encourage each child towards maximum development in all areas.
- To provide support for families by the availability of staff to give advice and to encourage parental cooperation and involvement.
- To promote a sense of community awareness towards needs of children and the work of the Scottish Council for Spastics by encouraging contacts within the community and by making provisions for professional visitors and students to benefit from the expertise available within the school.

One of the key successes of schools like Westerlea has been their involvement with orthopedic consultants and in Westerleas case, its close liaison with Bio-engineering Department of Princess Margaret Rose Hospital in

Edinburgh which assists with specific individual wheelchair problems.

Often there must be intermediate steps before a disabled child can be introduced to augmentative devices. The following case of a Scottish child exemplifies finding the "right" device to open communication channels.

Tom

Tom suffered a major injury at the age of 1 year and has been paralyzed from the neck down since that time. He is oxygen dependent and on long-term ventilation through a tracheostomy. Since the time of his injury he had been confined to a few square feet in the corner of an acute admission ward in a children's hospital. Trying to take him out was a major organizational problem requiring two nurses. He could be lifted into a Matrix buggy with a portable ventilator attached, but two large cylinders, one of compressed air and the other of oxygen, needed to be transported with him in close proximity to his buggy. Immense care was needed to ensure the ventilation tubes did not pull or become disconnected as this created great distress to Tom and increased his anxiety level.

Tom had no sense of independence or control during these excursions away from his corner of the ward and would often draw into himself not wanting to look at what was around him. He enjoyed the physical sensation of being moved over bumpy pavements but the trips were infrequent and did not allow his sense of confidence to develop.

At the age of 4 1/2 his powered wheelchair arrived. This was an Everard turbo chair with a Matrix seat. Major modifications were essential to mount the ventilators and the cylinders so that complete independence of movement was possible. The chair has a low center of gravity and was eminently suited to the modifications that were required. The control method was a mouth joystick mounted on a traverse bar across the front of the seat so that it could be moved into the most suitable position for him to use.

Tom is now a child who is not passively dependent despite his enormous handicaps. The motivational gains are crucial in a child who could become completely disinterested in his surroundings and readily give up in any tasks designed to stretch his intellectual skills. Being an institutionalized child, he had fleeting concentration and lack of perseverance as he could easily turn to another member of staff to interrupt an activity he was doing. The use of the chair combined with a development of efficient use of switches to control a computer meant that he suddenly found he was a capable and independent person who could complete an activity by himself and gain success.

The daily use of such a chair means that Tom can now drive himself to his own computer work station and with infra-red links to his base computer, use switches mounted on his chair to immediately run programs and drive himself away when he has had enough; the skills and opportunity any other able-bodied child has. The only regret is that he did not have these tools earlier.

This one observation does not speak of the progress of AAC use in Scotland. According to a study by Murphy et. al. (1992) because of the "newness" of AAC systems in Scotland it appears that few (if any) users have reached their communication potential. Consequently there may be a lack of role models; a lack of perspective using AAC in a wide and functional context and a lack of realistic vision of what can be achieved. The authors concluded that informal observations during their recent research suggests that few speech and language therapists specialize in the AAC field and therapists working with general caseloads may be required to work with AAC. In addition it is possible that few managers have direct experience of the implications of providing someone with an AAC system. The authors conclude by saying that change toward AAC in Scotland can only be brought about by education and training at all levels.

Future Considerations

Augmentative communication technology has had a dramatic impact on both educational achievement and daily communication functioning of individuals with disabilities. Through communication technology, individuals who lack the full ability to speak or write can now express themselves. The field of augmentative and alternative communication continues to evolve and continues to undergo changes. For individuals who are unable to communicate learning to communicate is a key to self expression, a way to say exactly what is on your mind. Ultimately literacy will emerge and when it does, it will manifest itself into access to a language. It appears clear to the authors that augmentative and alternative communication specialists now know more than a few years ago about face-to-face communication problems of individuals with congenital disabilities who are challenged by physical handicaps and speech impairments. However, relatively little is known about how these individuals learn to read and write. Teachers, clinicians and research-

ers have theoretical orientations that reflect both a skill development approach (emphasizes phonics, decoding and encoding skills) and the whole language approach (emphasizes meaning, whole word in context, language experience approach) approach to literacy learning. Being unable speak or move about independently certainly makes the task of learning to read and write different and more difficult. Thus, AAC models for literacy learning are evolving. They are based on what is already known about other populations, and the results of research with individuals who use AAC techniques.

In Scotland as the number of people using AAC systems increases, the lack of coherent funding policy becomes apparent. This is needed, not only for the purchase of equipment but also for maintenance, insurance, upgrading systems, and for staff time and training.

New technology has much to offer people with physical, communication or sensory difficulties. Computer and computer-based aids have become smaller, cheaper and more practical and can be readily adapted to provide individuals with disabilities with access to communication, education, recreation and employment. Communication systems with synthesized and digitized voice offers a means of communication for those who cannot speak; switches and other devices can be used by people with physical disabilities as an alternative to a standard computer keyboard; enlarged displays or voice feedback offer computer access to those with visual impairments; specialized software helps people with writing or spelling difficulties. "Low technology" systems such as picture or symbol books can be valuable too. The wide range of possibilities means that choosing and using these technologies with particular individuals can be complex and sometimes daunting.

Ultimately AAC interventions for students and adults with disabilities should draw both from the students' educational curricula and experiences as well as adult learners' environment. These should be implemented in the classroom and other natural settings. AAC objectives are normally embedded within and carried out in conjunction with the broader attributes in which targeted skills are necessitated. Data on the best practices in educating children and adults with disabilities consistently cite integrated therapies as a critical means of optimizing acquisition and generalization of skills while (in children) enhancing the participant's inclusion in regular education settings.

Another impetus to assisting the disabled is legislation. The American with Disabilities Act requires that all employees with 25 or more employees must comply with this act. This legislation requires that business provide "reasonable accommodations" by making existing facilities and work stations used by employees readily accessible to, and usable by, an individual with a disability. A number of vendors have developed tools to provide reasonable accommodations for people with mobility impairments or an inability to speak.

After researching this area, one realizes that one of the most empowering events in the life of an individual with a disability is gaining access to a personal computer. With access, a disabled person can learn to write, be employed and enjoy a host of other social activities that were once closed. As professionals we must provide skills and knowledge to help our colleagues, parents, and students with disabilities master the possibilities.

References

American Psychiatric Association. (1983). *Publication manual of the American Psychological Association* (3rd ed.). MD:Author.

Augmentative Communication Center, Newington Children's Hospital, PP31R/90.

The 3 R's, (1989, January). *Augmentative communication news* 2(1).

Beukelman, D.R., Yorkston, K.M., & Dowden, P.A. (1985). *Communication Augmentation: A casebook of clinical management*. San Diego: College-Hill Press.

Bigge, J.L. (1991). *Teaching individuals with physical and multiple disabilities*. New York: Macmillian Publishing Co.

Blake Huer, M. (1991) University students using augmentative and alternate communication in the USA: A demographic study. *Augmentative and Alternate Communication, 7*, 231- 239

Blaschke, C.L. (1986). Technology for Special Education: A National Strategy. *T.H.E. Journal*, 77-82.

Bowe, F.G. (1984). *Personal computers & special needs*, Berkeley: Library of Congress.

Bryen, D. & Joyce, D; (1985) Language intervention with the severely handicapped: A decade of research. *Journal of Special Education, 19*, 7-13.

Burns, E. & Mistrett, S. (1988). Switchware technology: Improving computer usage for students with physical or motor impairments. *Educational Technology, 28,* 45-47.

Calculator, Stephen & Jorgenson, Cheryl. (1991) Integrating AAC instruction into regular education settings. *Alternative and Auomentative Communication, 7,*(September) pp 204-206.

Cain, E.J. Jr. & Taber, F.M. (1987). *Educating disabled people for the 21st century.* Boston: College Hill Press.

CALL Center, Communication Aide for Language and Learning. The call center is a research unit within the University of Edinburgh's Education Department.

Cattoche, R.J. (1986). *Computers for the disabled.* New York: Franklin Watts.

Coombs, N. (1989). The computer as the great communicator. *T.H.E. Journal, 17,* 57-58.

D. Bengston, et.al. (1987). *Communication control and computer access For disabled & elderly individuals.* Boston: College-Hill Press.

Douglas, J.O. and Ryan, Martina (1987) A preschool severely disabled boy and his powered wheelchair: A case study. *Child Care Health and Development, 13,* 303-309.

Enderby, P. & Phillip, R. (1986) Speech and language handicap: Toward knowing the size of the problem. *British Journal of Disorders of Communication, 21,* 151-165.

Fagan, T. (1991). National support center a service of IBM. *Exceptional Parent,* pp. 12-14.

Fishman, I. (1987). *Electronic communication aids.* Boston: College-Hill Press.

Gombos, C. (1991). Securing technology funding. *Exceptional Parent,* pp. 1-6.

Locke, P.A. & Mirenda, P.(1988). A computer-supported communication approach for a child with severe communication, visual and cognitive impairments: A case study. *AAC Augmentative and Alternative Communication,* 15-22.

Margalit, M. (1990). *Effective technology integration for disabled children.* New York: Springer-Verlag.

McKenna, J.F. (1989, August 21). The mother of adaptation. *Industry Week,* p. 40.

McWilliams, P.A. (1984). *Personal computer and the disabled.* New York: Quantum Press.

Moore, J. (1990 October) Finding the right educational software for your child. *Exceptional Parent,* pp. 58-60.

Murphy, Joan, et. al., (1992) Final report to the Scottish Council for Spastics. *Augmentative and alternative communication systems in Scotland. A demographic Study.* pp. 2-5, 24-27.

Office of Technology Assessment, United States Congress. (1983). *Technology and Handicapped People,* Washington, D.C: U.S. Printing Office.

Perkins, W.H. (1985). *Speech disorders in adults.* San Diego: College-Hill Press.

Rowley, C.M., Stowe, J., Bryant, J. & Chamberlain, M.A. (1988) Communication aid provisions 1983-1986. *British Journal of Disorders of Communication,*23, 1-11.

Scottish Council for Spastics, Westerlea School. (1992). *Aims of the School,* p.l. Ellersly Road, Edinburgh.

Scull, J. & Hill, L. (1988). A computerized communication message preparation program that "learns" the user's vocabulary. *AAC Augmentative and Alternative Communication,* pp. 40-43.

Shell, D.F., Horn, C.A., Severs, M.K. (1989). Computer-based compensatory augmentative communications technology for physically disabled, visually impaired, and speech impaired student. *Journal of Speech Education Technology,* 29-42.

Wilson, M. (1990, July). Legislation could cost millions. *Chain Store Age Executive,* pp. 29-31.

Workplace tech helps the handicapped compete. (1991, December). *Popular Mechanics,* p. 20.

Valletutti, P.J., McKnight-Taylor, M., Hoffnung, A.S.. (1989). *Facilitating communication in young children with handicapped conditions: A guide for special educators.* Boston: College-Hill Press.

Author Note

The research assistance of Marie Savoca, Management Information Systems Graduate, Central Connecticut State University, New Britain, CT is acknowledged. Her basic research provided the impetus for the research effort in the United States.

Suzanne May Keith, Speech Therapist, is acknowledged for the countless hours she spent with the authors at the Newington Children's Hospital. Her knowledge of AAC has proved to be invaluable in our own research effort.

In Scotland, Sally Miller of the CALL Center at Edinburgh University, Janet Scottf Ruth Rovie and Ann Anderson of theWesterlea School are acknowledged as being most important in the development of this paper.

Sources of information

The main professional source of information about people who use AAC systems is the speech/language therapists. The speech/language therapist is responsible for the assessment, selection, recommendation and implementation of an AAC system.

The Scottish Council for Spastics provides a range of educational, social and therapy services.

CALL Center (Communication Aids for Learners in Lothian) is an action research unit partly funded by the Education Department of the Scottish office. It is a resource center which provides information and advice on augmentative techniques and technology for communication and learning.

SCTCI (Scottish Center for Technology for the Communication Impaired) is a national center funded by the Scottish office, Home and Health Department. Its activities provide an assessment and advisory service to people with complex communication problems and to their career/therapists/educators.

Computer Applications for Special Needs Students: What Canadian Teachers Use and Need

C. Laine
The University of Western Ontario
London, Ontario

L. Sandals
University of Calgary
Calgary, Alberta

J. Hughes
University of Manitoba
Winnipeg, Manitoba

Abstract

While the computer seems to have made significant inroads to the regular curriculum and classrooms of our country, some question just how much impact it is having in the education of special needs students. In this study, 512 Canadian special education teachers from Ontario to British Columbia participated in the first national survey on access, use and needs related to computer technology and special needs learners. The findings indicate classroom access and teacher training were the major determinants related to actual use. Generally, the computers were used for a limited range of tasks: the greatest being in Language Arts and basic drill tasks. There were definite patterns in the architecture used across the region: Apple/Macs were ascendent in the West; ICONS in the East. The areas of greatest need appear to be acquiring more specialized hardware and support that would appear related to the types of disabilities the teachers are working with. Also the teachers identified improved access to training as essential to further use.

Developing educational software and the applicable uses of computer technology affects all target groups in the K-12 and postsecondary settings. Software developed especially for the K-12 area is produced to meet the needs of as many students as possible. This situation is analogous to the standardized tests our schools have been using even after the introduction of criterion referenced assessment. The greater the potential market, the easier it is to recover the development costs producing greater profit incentives. Software that is suited specifically to those with special needs and with different readability levels, decreases the range of the target audience. Thus it becomes more difficult to make appreciable sales that would even cover the original development costs.

The major responsibility for the selection and purchase of computer hardware and related educational software is carried out by the school or divisional computer coordinator in most school districts. This individual would tend to look at the greater good and needs of the whole board or division; thus, the purchases usually reflect "generalized" software and computer application needs. While input from educators of special needs students may be considered, the budgets usually are

prioritized based on the number of students, or the resourcefulness of individual educators. Thus, the software and applications available to special needs students and their teachers tends to be arbitrary. This state seems even more inconsistent for the increasingly common mainstreamed environment.

Based on these concerns and issues, the authors decided that a semi-national needs assessment of administrators, consultants, and teachers in special education was warranted; (1) to learn what software and related applications should be created to meet the specific needs of the child; and, (2) to provide a closer link between the objectives of more individualized special education curricula and their related scope and sequences. The results should show what software and applications can be used in an adjunctive or mainline support role in the classroom.

Table 1
Mailouts and returns

	Nation					
	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Total
# mailed	400	200	200	125	400	1325
# returned	118	97	124	66	107	512
% returned	30%	49%	62%	53%	27%	39%
% Nation	23%	19%	24%	13%	21%	100%

Methodology and Procedures

The authors used a previous instrument which they had developed for a provincial study in Manitoba in 1986. It had been published under the title "Computer Software for Special Needs: What is Really Needed?" The instrument was modified with input from the ministries of education of the five Canadian provinces sampled in this study. The data collection took place from January through March 1990 by the authors: with the support of Ministry officials in B.C., Alberta, Saskatchewan, and Manitoba. The data collection in Ontario did not receive any support from the Ministry of Education and was carried out by the Centre for Special Education Technology (CSET); an affiliate of the University of Western Ontario. The distribution of the surveys and returns by province is summarized in Table 1.

In British Columbia, the Ministry of Education gave the educators' names to a research centre at the University of British Columbia. The surveys were mailed out with a cover letter from the Ministry. In Alberta, the Educational Response Centre (ERC; part of the Ministry of Education) mailed out the surveys to teachers chosen at random with a covering letter from a high ranking government official. Completed surveys were then collected at the ERC. In Saskatchewan, the Department of Education sent out the surveys officially to a random sample of teachers in their data base. The Manitoba Department of Education sent a list of teachers' names and an official cover letter to one author at the University of Manitoba. The Manitoba surveys were sent out and returned to the University. The senior author at CSET compiled the Ontario lists, sent out and received the surveys. All returns were subsequently forwarded to the University of Calgary for compilation and initial analysis.

The final survey consisted of forty-four questions with thirty-eight items having some form of forced choice response and six items with a structured open ended response format. The British Columbia version had three fewer forced choice questions because the Ministry did not want the teachers asked questions regarding their involvement in consortia.

In the first section, eight of the forced choice questions dealt with demographic information of the school setting and the type of students; seven questions concerned hardware and software availability; seven questions involved classroom applications of the hardware and software; and, five questions related to the respondents' professional training and development issues.

The second section of the survey dealt with attitudinal responses of (strongly agree, agree, uncertain, disagree, strongly disagree) to nine questions. These questions involved issues of future needs in the area of computer applications to special education.

The third section of the survey had two forced-choice questions dealing with the use of adaptive devices and the social integration benefits of computers. There were

Table 2
Respondents' working environment (percentage)

	Nation					
	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Total
Integrated Setting	81.3	44.2	76.4	62.2	79.4	70.3
70% Segregated	22.0	44.2	26.0	34.9	14.0	29.7
Other	26.3	20.6	25.0	22.2	19.6	23.0

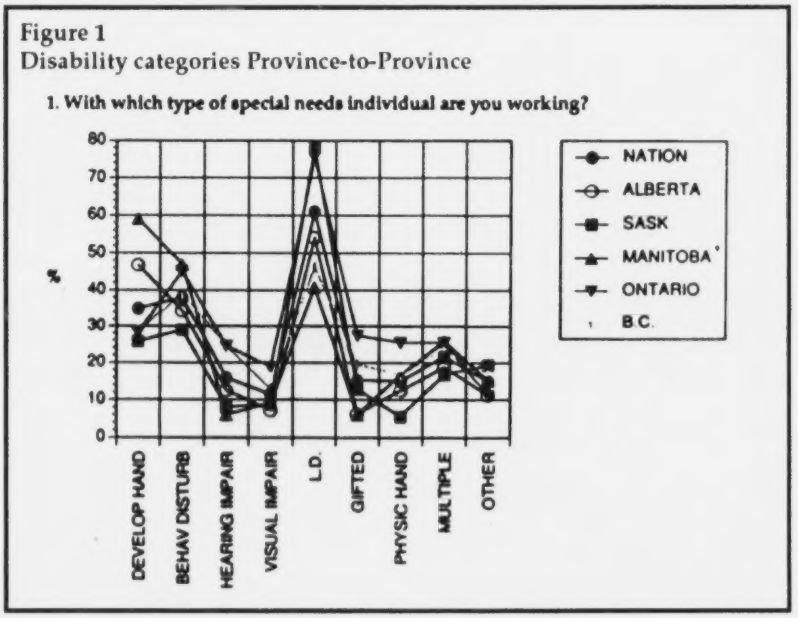
six open-ended questions dealing with the hardware, software and professional development needs of the teachers and their students.

Table 2 shows the environment in which the respondents work. The majority work in integrated settings. This picture mirrors the growing mainstreaming movement and the multiple environment that many teachers find themselves in. Only Alberta figures show a balance between integrated and segregated settings. The totals also exceed 100% suggesting that most teachers in special education work in multiple environments. This ranges from 9% overlap in Alberta to 29.6% overlap in British Columbia. Given the geography of scattered--often cutoff--communities in British Columbia, teachers often expect to work in multiple environments. Other relevant demographics of the 512 respondents showed that: (a) the majority work for boards under 10,000 students: (19%) came from school boards or divisions of under 2000 students, (25%) from 2000 to 5000, (17%) from 5000 to 10000; (b) (60%) described their schools as urban, (35%) as rural, and (5%) as northern; and, (c) (25%) said they taught grades K-3, (26%) 4-6, (23%) 7-9, (10%) 10-12 and (16%) as "others" (e.g., usually resource teaching across many grade levels).

While these demographics vary only minimally, the returns from Saskatchewan showed almost equal representation from urban (48%) and rural schools (47%). Although Ontario is considered the most urbanized of the provinces, the greatest urban response was from Manitoba (80%). The highest northern response came from British Columbia (12%), more than double the national average. These variations may have some bearing on the responses to other questions. For example, one might expect teachers from British Columba, who are in Northern and multi-environment situations, to have less support and time for intense computer use. In the future, such work environments could make considerable use of them.

The profile of special needs clients differed little across the country as can be seen in Figure 1. The profile from province-to-province shows strong similarity apart from the higher numbers of "Developmentally Handicapped" students reported being served by the school system in Alberta and especially Manitoba. By far the greatest proportion of students served, are those with learning disabilities, followed by those who are behaviorally or emotionally disturbed. Apart from students identified as "Gifted," the more specific, clinical categories of disability had fewer clients.

Figure 1
Disability categories Province-to-Province



Results

Computer Access

For the survey to have any meaning, it is important to see just how available or accessible computers are to the teachers Further, we wanted to see what significant relationships exist between this accessibility and the teachers' actual use of computers.

Table 3 shows a summary of crosstabs analyses with chi-square statistic (level of significance; $p < 0.05$). The variable that showed significance across the country and for all dependent variables, was whether or not the teachers had computers assigned to their classrooms (q.13). However, whether teachers had access to a computer lab in their schools (q. 11) was not a significant factor. Whether teachers had training or not (q.23, 24, 26) was also a nationally significant factor. It related to whether or not the teachers used a computer and how much they used one in their teaching if one were available. This significance is reflected in Ontario responses where the Education Ministry has made such training a priority.

Figure 2 shows the availability or access to computing equipment. Responses to questions (11, 13) designed to identify teacher access to computers for instructional purposes, showed that (70%) of respondents have access to a computer laboratory. The Manitoba teachers differed from the other respondents; only (48%) said they had access to computer labs. As they were also from predominantly urban schools, it was hypothesized that computer labs might be a lesser focus in Manitoba schools than in the other provinces.

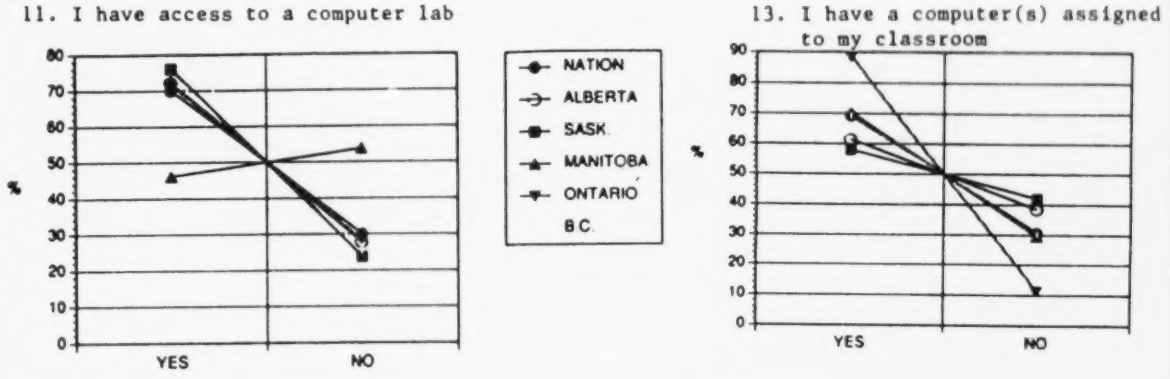
The significant factor related to actual use of computers was whether or not the teachers had a computer assigned to their own classroom: even though the number of teachers was about the same as those reporting lab access (69%). Ninety percent of Ontario teachers reported having computers in their classrooms. More Manitoba

Table 3
Summary of Crosstabs Analyses (Chi-square statistic)

Independent Variable	Dependent	National	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario
(Q13) Computers in Classrooms	by Hours Worked	*	*	(.10)	*	*	*
	CAI used	*	*	*	*	*	*
	Word Processing	*	*	*	*		*
	Literacy Use	*	*		*		(.10)
(Q23) CAI Training	by Hours Worked	*	(.10)				
	CAI used	*					*
	Word Processing	*					*
	Literacy Use	*	*	*			(.10)
(Q24) CAI Training for Special Needs	by Hours Worked	*			*	(.10)	
	CAI used	*					
(Q26) CAI Workshop	by Hours Worked	*			*	*	
	CAI used	*		*	*		
	Word Processing	*			*		

*p<.05
(These data are presented for descriptive purposes only)

Figure 2
Access to Computing Equipment (Q.11 and Q.13)



teachers (70%) reported having access to computers in their classrooms than having access to labs; which may account for a very high count of computer use by Manitoba and Ontario teachers.

The type of computer in use is indicated in Table 4. The National figures reveal that Apple computers continue to be the dominant model in use in Special Education classes; but, the figures for this question mask the fact that there is considerable variation in the type of computer in use across the Provinces. In Ontario for example, the computer most frequently reported was the ICON (44%). This finding is not surprising given that the Ontario government identified the ICON as the computer for special funding during the 1980's. The ICON is followed by the Commodore (39%); only 10% are Apples. In each of the other Provinces, Apple is the dominant model (range 45- 71%).

Table 4
Type of Computer Used

Apple	50%
Commodore	15%
IBM/compatible	15%
ICON	13%
Macintosh	6%
Others	<1%

Computer Use by Special Education Teachers

Special Education teachers report they have access to a variety of software. Table 5 shows the primary uses. Teachers use computers predominantly for drill (43%) and word processing (38%), computer assisted instruction (65%), and for administrative purposes (67%). The administrative use of computers by Special Education teachers includes use for the preparation of IEP's (41%), assignments (38%) and for recording student progress (34%). Forty-one percent of those who did not use computers for administrative purposes indicated a desire to use them for developing IEP but were unaware of IEP programs. Only 27% reported no administrative need in their current situation.

They use the computer with the LOGO language to a much lesser extent (21%). Those who said they did not use LOGO fell into two major categories: those who did not use it but would like to know how (34%); and, those who did not think it appropriate for their particular children (39%).

Software Availability

Few special education teachers reported difficulty having access to software through their own Division office (15%) although several respondents were uncertain about such availability (22%). An additional source of courseware was through consortia such as the Minnesota Educational Computer Consortium (55%). Here again there was a sizable proportion (29%) who were uncertain whether their Divisions were members of such organizations. In total, a substantial majority of respondents (85%) reported ready access to courseware for use in their classroom.

Table 5
Software used (percentage response)

	Nation					
	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	National
Language Arts	83.5	67.6	90.4	67.0	69.0	77.0
Mathematics	27.4	34.7	32.0	44.3	22.2	30.0
Drill & Practice	29.0	45.0	56.0	66.0	33.0	43.0
Simulations	11.3	13.0	10.4	10.7	8.7	9.0
Tutorials	16.0	21.8	27.0	25.0	19.0	18.0
Word Processing	37.0	24.7	64.2	20.0	32.5	38.0

While the major use of computers use nationally was related to Language Arts (77%), the teachers reported that they need further courseware developed for their students. Perceptions regarding the need for new development in various content areas is shown in Table 6.

The majority of perceived development need is still in the area of Language Arts (62%) but there are regional variations. The primary need in British Columbia is in the Math/Science area (53.4%). In Mathematics, the teachers also thought more software should be developed in Basic Skills (63%), Number Theory (18%), and Problem Solving (19%). In Language Arts the areas grouped into two broad categories: Reading and Lower Level Vocabulary (64%) and Grammar and Spelling (36%).

Three provinces indicated a need for software focusing on Lifeskills. Eight percent of responses also identified a specific need for software that focusses on problem-solving and decision-making; these responses were not tied to specific curriculum areas. Teachers also need programs which allow for slowing the pace, use

Table 6
Software used (percentage response)

	Nation					
	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	National
Language Arts	36.7	65.5	74.2	51.6	64.0	62.0
Mathematics	46.7	27.3	21.0	32.2	30.0	29.4
Science	6.7			6.5		1.7
Social Science	10.0	1.8		9.7		3.0
Special Applications		5.5	4.8		6.0	4.0

lower comprehension levels and increase the use of voice input and output.

Although teachers reported needing specialized devices, (80%) said they either did not use them or have them available (94% in Alberta). Voice output (35%), special switches (30%), keyguards and keyboards (27.5%) were the most-used assisive technology devices.

Teacher Preparation

Generally, a high proportion (70%) of respondents reported they had attended a workshop on computer-assisted learning. A smaller proportion (37%) reported they had completed University courses in computerassisted learning. Few indicated these courses focussed on computer-assisted learning for children with special needs. The Ontario Government entered into a joint project with IBM and The University of Western Ontario to provide a special needs access focus. Workshops were attended by several hundred teachers in three years. That Centre has since been closed.

Current and Future Needs

Definite response trends emerged in response to the attitudinal scales regarding the teachers' perceived needs. With respect to courseware development: 81% of the teachers either agreed or strongly agreed that the provincial department or ministry of education should play a major role in the development of software for those with special needs. Only 15% of the teachers agreed or strongly agreed with the statement that computer courseware was too costly to justify its use in their classroom. Additionally, only 34% agreed, or strongly agreed, that there was enough suitable courseware for the curricula that they used with their special needs students. However, 85% of the teachers felt that they would use the computer more often if the appropriate hardware and software were available.

Regarding the location of the computer, it seems the teachers would like to have the best of both worlds. Approximately 60% of the teachers either agreed or strongly agreed with the statement that "I would prefer to have access to a computer lab on a regular basis." Also approximately 89% also said "I would prefer to have one or two computers in my class permanently. " When it came to the issue of their own involvement: 90% agreed or strongly agreed that special education teachers should have input into the development of courseware for their curriculum. Further, 89% agreed or strongly agreed that a catalogue or inventory of special education relevant

Table 7
Augmentative and assistive devices needed (percentage response)

	Nation					
	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	National
(A) Used:						
Mouse/Joystick	5	22	0	6	0	5
Single Switch	14	11	0	23	33	27
Echo II	30	22	20	20	20	20
Voice I/O	15	11	25	14	20	16
Touchscreen	15	11	5	11	7	9
Powerpad	21	22	50	26	20	23
(B) Needs:						
Computer in the Classroom	29	11	0	7	12	9
Enlarged Print	0	11	15	7	15	9
Voice I/O	57	42	48	22	38	47
Touchscreen	5	11	8	19	12	11
Single Swith and training	9	25	23	45	23	24

courseware should be made available to each school in their province. Finally, 91% of the teachers either agreed or strongly agreed with the statement: "Teachers can use simulations and games for generating special participation in the classroom for exceptional students. "

Besides the forced-choice questions, the teachers were given an opportunity to respond to their present and future needs in an open-ended format. Because of the wide variety of responses, an expert in the area of educationally related courseware categorized the variety of responses so that a meaningful tabulation could be made.

In the area of needs related to improving the computer environment, adaptive or augmentative devices, several enhancements were suggested as shown in Table 7.

The current uses reflected hardware most associated with limited functioning students: single switches (27%), Echo synthesizers (20%), and Powerpads (23%). There was a considerable range in adaptive equipment use from one area to another. Current needs also focused on a variety of hardware to equip their classrooms. Nine percent just wanted a computer in their classrooms; teachers in Saskatchewan seem satisfied with their technology access but almost one-third of the British Columbia teachers were in need. Specific differences between usage and need were in the area of Voice Input/Output (range 16-47%). Again British Columbia teachers (57%) reported the greatest need. The highest demand for single switch technology and training came from Manitoba: the province that also reported the highest proportion of developmentally delayed students as clients. The enlarged print demand could also reflect the growing number of visually impaired students in the school system. As to future needs, (59%) focused on hardware and (22%) focused on software. However, the teachers also indicated needs for specified funding (13.5%) and time to become familiar with the technology (5%).

For the question "What type of screen, color or sound and input output techniques would you like incorporated with the coursewarew" (55%) wanted color, (28%) wanted voice input/output, (ll%) touchscreen, and (6%) large print. Teachers were equivocal in their response to whether or not computers help to promote social integration. Most of the Ontario and Manitoba respondents said computers helped in cooperative learning environments and in promoting social skills.

Finally, to the question: "What limitations (if any) do you find in the use of the computer with special needs children?" brought the following responses. They were related to: inappropriate reading levels (43%), human resources (20%), fine motor limitations impairing their use (20%), and programs increase with difficulty too quickly (17%).

Discussion

These results of this study have implications for both pedagogy and technology. The major pedagogical implication is for teacher preparation; teacher awareness of the instructional roles of computers; and, training in courseware and computers for their teaching.

The teachers will more likely use the computer in their teaching *if it is in their classroom*, but less likely if they have to take their students to a computer lab. There is a need to find out whether the reasons are physical, personal or pedagogical and give them guidance on alternate uses. Often, where teachers have multi-environment jobs, the convenience of having the technology at hand may be a crucial factor. However, teachers on Manitoba had the least access to computers in their classrooms and were among the highest needing training. The connection nationally is strong. Teachers use the computer more if they have had any specific CAI training; whether that is connected to special education or not. Most of the computer-users have already found some administrative uses especially where they also relate to the development of Individualized Education Plans (IEP). The minority suggested that they would like to use a computer for developing IEP's but were unaware of appropriate software. This has obvious implications for planning specific inservice and preservice education.

The greatest curriculum use is in the area of language arts (77%); the major applications were wordprocessing (38%) and drill-and-practice (43%). Little use is indicated for simulations, for science or social science instruction. This is a very limited functional range of the computer as an instructional tool and only half the users perceived the computer serving a social integration function. But the restricted use, the areas of most concern (language arts, voice output, larger screens) and the lack of use of adaptive devices may be affected by the population taught (Learning Disabled, 61 %) and the range of curriculum the teachers feel they have to follow. What is not known is the nature, extent or availability of planned inservice education for teachers in the application of computers in their work or their effects on instruction. This is an area for evaluation and potential development.

The *technical implications* center on: physical location, hardware, courseware, and peripherals. First, use of ac-

cessible networks (which school boards are purchasing in larger quanity) is not a significant issue. If in-class computers are more useful and needed, then *distributed networks* need to be given greater consideration than an "all-in-one-room" approach. Secondly, the configuration is weighted nationally toward Apple (58%) but there is considerable variation among the provinces: especially Ontario where the ICONs and Commodores are used by almost 83% of the special education teachers. The large number of Macintosh computers reported in British Columbia (about 14%) was surprising given the small 9" screen; the lack of color; and, the small amounts of appropriate software products available at the time of the survey. Also, teachers with essential training will tend to use the software with which they are most familiar, even if it is not "state-of-the-art."

The perceived current lack of equipment generally, and of specific devices, (e.g., 84.6% of Ontario responses) and future needs (e.g., Ontario hardware needs 59%) overrides all other "needs" responses. Specifically, one-third of the respondents call for voice activated or voice output as a primary need. Further, it appears that if there is not the appropriate equipment, the teachers feel there is little need for training (e.g., Ontario: 2.9% now; (5.4%) future needs). These two aspects marry the technical and pedagogical needs and must be so considered for effective implementation.

Teachers who saw a social function of the computer found a need for courseware that would encourage cooperative and interactive learning environments. Teachers also wanted more courseware that incorporated quality graphics, voice and touch-screen capabilities. These multi-sensory aspects to courseware cannot go unnoticed by either developers or professional trainers. Finally, the perception that instructions and manuals are inappropriate or too difficult to follow reflects on the suitability of the software itself; teachers may use a program inappropriately, or not at all.

Implications

In summary, the implications of this study are that:

1. Teachers can and will use computers more often if they are in their classrooms;
2. Teachers use computers more often if they have had some specific training or preparation;
3. administrative uses are mostly for IEP development;
4. The greatest use is in Language Arts: mostly for drill and practice, and word-processing;
5. There was little use in Science, Social Sciences and Simulations - although needs were reported for these areas;
6. The role of computers in social integration is equivocal but no particular reasons were offered;
7. There was no major use of adaptive devices; but then are these seen as necessary by teachers in learning disabilities?
8. There is a need for more planned and focused inservices (like the Slates to Silicon conference in Saskatchewan; and The Centre for Special Education in Ontario);
9. Schools need more distributed networks through *each classroom*;
10. The Apple system is still the most used. The IBM & clones are increasing and these figures will likely be different in two years. Macs have potential but the costs are still relatively high;
11. The greatest present and future need seems to relate to voice input and output;
12. Teachers feel their time in training is wasted unless equipment or the funds for purchases are available. This response also applies to a reported need for more multisensory media;
13. The wish list is less and had more realistic expectations than in 1986 (Sandals & Hughes, 1988). The technical needs and support are the same;
14. Logo seems to have become a passing fad when compared to 1986 results;
15. There is a need to cross validate these results with others from the U.S. and other international settings; and
16. There is a need to conduct a third survey in Canada by the mid-1990's.

Conclusions

Several trends and many questions arise from the results of the survey. A predominant trend appears relating professional preparation and classroom access to the use of computers in special education. Second, there appears to be a variety of hardware standards across the country. These standards appear to differ from the beliefs of many courseware and hardware producers. If most of the architecture in special education in Ontario, for example, is ICON and Commodore, it will be reflected in the needs of the teachers for (new) software and support. It is possible that marketing divisions of many producers may be "out of sync" with special education classroom reality. Given the financial situation many School Boards and Divisions find themselves in, this state of affairs may remain for some time to come.

On the other hand, developing applications specifically for one architecture will impact on their use and on teacher training. If teachers are trained on one architecture for which there are specific programs, and the Board or Division changes its purchases (which marketing divisions of computer companies work to encourage), then there will be a constant need for further professional training, for which there is insufficient time. This can be offset by writing courseware that can be amended for different architectures: which is essential in the public field with limited funding. The question is, does that make marketing sense? Or, should teachers be shown the benefits of emulators that will connect computers with different platforms? Alternatively, does this perpetuate courseware to the lowest common denominator of the machine?

The teachers using computers do so in a limited way. The equivocal social integration aspect may be a function of the hardware, the type of software available, or of the education of the teachers in the effective use of the computer in cooperative learning environments. Further, the relationship among the amount of use; type of uses; training; perceived needs; and, reported limitations of computers with special needs learners is a cycle that has to be broken.

Critical questions arise from this study: is teacher training the central key or will improved teacher training be useless without the accompanying equipment? Will buying more and varied equipment be appropriate if there are inadequately trained teachers? Is there a need for courseware developers to provide programs that match the instructional needs more closely? If the appropriate equipment is available, will the teachers use it effectively if they perceive the programs and instructions to be too difficult for the exceptional learners to use? Questions like these must be attended to if the computer is to become a sound educational tool not only for special needs learners but also for elementary, secondary and postsecondary schooling; and, for career training.

Reference

Sandals, L. & Hughes J. (1988) Computer software for those with special needs: What is really needed? *Canadian Journal of Special Education. 4*, 23-41.

Author Note

This study was carried out with the financial support of the University of Calgary SSHRC Research Grant Fund; and, the Provinces of Alberta, British Columbia, Manitoba and Saskatchewan; the University of Manitoba; and, the Centre for Special Education Technology of The University of Western Ontario.

Augmentative Technology and Social SkillsTraining for Students with SpecialNeeds in Israel: "I Found a Solution"

Malka Margalit
Tel Aviv University

Abstract

This chapter presents a computer-assisted social skills learning program, and related outcome research studies, in an attempt to demonstrate the use of technology within intervention programming. In the current program, the computer was used as a controlled environment for experimenting and rehearsing solutions for social conflicts, and promoting mastery of effective strategies. The five reported studies were used to demonstrate the interrelations existed between the program development and research findings. Three sources of information were used to evaluate the program: students' self reports, peer ratings and teachers' perceptions.

The first three studies focused attention at students with mental retardation, and demonstrated within an experimental/control design the impact of the computer assisted instruction. Various aspects such as promoting social skills and empowering students to cope with their loneliness were emphasized in the intervention programming following the research conclusions. Studies 4 and 5 were included in this report in order to demonstrate the move from evaluating the change in one group of students with disabilities to comparisons of several groups and subgroups. More research is needed to further explore the impact of the various aspects and variables within this program, for learning and generalization of competent social behaviors.

The quality of interpersonal relations has comprised a key concept within theories of normal human development (Milic & Aron, 1991). The social interactions and the quality of relationships of children and youth have been related to their later adjustment in adulthood; therefore, early interventions to remediate social difficulties appear crucial (Hensen, Watson-Perozel, & Christopher, 1989). Initial deficits in social skills may limit opportunities for successful future interactions, which, in turn, may further restrict the development of social competence. Students with mild disabilities (i.e. children with learning disabilities, behavior difficulties or mild mental retardation) often experience difficulties in establishing satisfactory peer relations and close companionship. They were considered to be deficient in social skills and social knowledge (Gottlieb & Leyser, 1981; Pearl, 1992) and have been described as experiencing relatively high levels of loneliness, distress, and dissatisfaction with their social lives (Taylor, Asher & Williams, 1987; Vaughn & La Greca, 1992).

Research targeting social skills among students with special needs has become a major focus, not only in planning effective interventions but also in fostering a theoretical understanding of the nature of these children's social difficulties (Elliott & Gresham, 1989). In view of the pervasiveness of their social problems, their disability definitions include the social difficulties element (Grossman, 1973; Hooper & Willis, 1989), emphasizing its importance.

Poor social performance may be conceptualized as related to three different sources that may interact together (Vitkus & Horowitz, 1987). One possibility is that the children lack relevant knowledge of the elements leading to social competence. Within the information

processing model, these students demonstrate their difficulties in processing environmental information, actively exploring social interactions and effectively solving social situations in a rewarding manner. These students often manifest deficient social skills and behavior difficulties (Gresham & Reschly, 1986; Kramer, Piersel & Glover, 1987).

The second source of difficulty focuses attention at the performance difficulties. The students have acquired the social information, but demonstrated significant difficulties in translating it into age-appropriate activities because of performance difficulties or interference stemming from competing emotional responses such as anxiety or aggression. The third source focuses attention at the motivational perspectives. The children who have accepted the role of the lonely and/or rejected individuals, take on a particular interpersonal role, and the reciprocal interaction patterns may perpetuate behaviors that are consistent with that unique role and personal reputation among peers (Horowitz & Vitkus, 1986).

The purpose of this paper is to present the computer-assisted social skills training program "I Found a Solution" (Margalit, 1990a) that has been developed in Tel Aviv University, and to report the results of several studies, examining its impact for promoting the social competence among different groups of students with special needs. The integration of technology for assessment and intervention into students' social competence and cognitive problem solving has been highlighted by several studies (Irvin & Walker, 1993; Margalit, 1990b; Resnick, 1989; Woodward, Carnine & Gersten, 1988). Video images and simulations have been proposed to increase student participation and involvement, enabling the low-achieving students the needed practice in critical areas (Woodward, Carnine & Gersten, 1988). Yet research evaluating the impact of the simulations revealed mixed results (Hasselbring, 1988; Woodward, Carnine & Gersten, 1988), indicating the limited value of simulations as a solitary activity and emphasizing the importance of a comprehensive instructional model that integrates teaching strategies and individualistic approach with the use of the software.

The present computer-assisted social skills program attempted to provide students with a controlled and structured mini-environment (i.e., computer environment) in which the students will be able to acquire social concepts, experiment with different solutions for conflictual social situations, develop effective strategies, and achieve skillful performance. Computerized social simulations and adventure games were presented within the "I Found a Solution" intervention program, group discussions and homework tasks were used to rehearse the effective problem solving model. In line with Manning's (1988) suggestions, the strategy training included in this intervention consisted of cognitive self-instruction elements such as teaching the student how to devise and monitor solution plans and to evaluate their value from the student's point of view.

The Social Skill Training Program

The program consists of computer software as well as non-computerized training procedure and a repertoire of activities. The computer assisted "I Found a Solution" package (Margalit, 1990a), using an IBM PC/XT and compatible with colored monitors, presents 24 computerized interpersonal conflict scenarios, three adventure games and a computerized diary "What is happening to me?".

The Scenarios

The short 24 scenarios focus attention at difficult social events within various environments: school, work, family life, and leisure activities. Working with these scenarios was expected to advance the children's schematic understanding of social interactions, through training in the mapping out of alternative actions and solutions.

In order to enhance the relevance and motivation of the intervention's contents, the specific contents of these scenarios were based on anecdotal case studies of interpersonal difficulties collected from youngsters and significant adults (e.g., teachers, parents) over a 3 month period (Margalit & Weisel, 1990). Descriptions of conflictual situations such as *"Gal in a Special Class: The children laugh at Gal because he is a student in a special class. They call him names. What would you do in Gal 's place?"* or *"Ofer is Restless: Ofer arrived at school feeling restless and bored. He doesn't know what to do. What would you suggest for him to do?"* were presented on the computer screen. The student was asked to select one of the four proposed alternative solutions, and thus either gained or lost points accordingly:

1. A positive active-assertive solution (e.g., negotiation in an appropriate manner).
2. An information-seeking solution (e.g. consulting a peer or a teacher).
3. A negative active-aggressive solution (e.g., hitting or cursing).

4. A passive-avoidant solution (e.g. running away, crying).

At the beginning of each interaction with an episode, the student receive 100 points, and can gain or lose points throughout the decision-making process according to his/her selection of the proposed alternative solutions. The aggressive or passive avoidant solutions resulted in losing points. Asking for an adult's help may have gained the student some points, but the largest number of points was provided for the assertive, negotiating type of solution. Points were accumulated over the decision making process within each episode and were combined into a general score, ranging from 0 to 690 in the students' feedback summary. The software also includes an Editor for convenient modifiability in terms of individual teacher or student needs. The first and the second screens of Ofer's scenario are presented in Hebrew in Figure 1.

Adventure Games

Each of the three adventure games was based on the same problem solving strategy construct, providing the children with the same solution alternatives and the game formate as the short scenarios. The goals of the adventure games were to further motivate the student to experiment with the problem solving process within a longer and more challenging plot. These games provided contents that children consider exciting and engaging.

Yoav's Adventure describes Prince Yoav's fairy tale escapade in a mythical land with royal families and evil and powerful enemies. Magic and social realities were joined together in this modern legend to make the social training more challenging.

Robert and the Secret Gang depicts the visit to earth of Robert, a youngsterlike robot who hailed from another planet and who was in constant need of his peers' friendly guidance in areas of interpersonal decision making. Two young Israeli students assisted the Robot to learn well-adjusted social behaviors, avoid dangers, while constantly attempting to bring peace to the country.

The Land of Endless Opportunities describes a boy who arrived at different imaginary worlds of unlimited options and possibilities. The boy experimented the life in communities with different sets of rules and regulations and through these experiences social conventions and the different limitations that society poses on their members were discussed.

Figure 1
The screen image from *Offer is Restless*, in Hebrew.

"What's Happening to Me?"

This software was developed as a computerized diary to promote self-monitoring and help planning and organizing one's approach to problems, within a structured framework based on the same problem-solving model used for "I Found a Solution." The program presents the students with a set of questions, encouraging them to modify or add options to the problem solutions. The students were encouraged and guided to maintain a record of their day-to-day problems and solutions for future personal counseling and group discussion. The teachers can also follow up on their students' progress in their social problem solving patterns, and plan the individualized intervention. Figure 2 presents an outline of the program.

Training Procedures and Accompanying Materials

In addition to the computer software, the package contains non-computerized accompanying materials (e.g., teacher manuals, student workbooks) and training procedures (e.g., suggestions for group discussions, role-playing, and homework assignments). The recommendations made by Deshler, Alley, Warner and Schumaker (1981) were adopted, whereby the strategy training emphasized modeling, explaining, and rehearsing of the desired strategies (i.e., effective assertion, cooperation, and self-control), while continuously pointing out the advantages of applying them. Teachers have been trained to implement the following training procedures together with the use of the computer simulations in order to reach fluent processing in the desired social skills:

1. Active learning. Learning problem solving, similarly to any skill learning, requires active participation of the learner (Pfeiffer, Feinberg & Gelber, 1987). Teachers were sensitized to the impact of the learning environment on the levels of students' activity.
2. Schema training. Structured presentations of the simulated social situations can facilitate the students' ability to develop age-appropriate social schemata, in line with the research on the novice/expert problem solver (Glaser, 1984; Mayer, 1987). For example, a student who wants to join a ball game will be instructed to learn the various options of the "joining" peers and "entry into a group" schema,and will be trained to map out, experiment solutions, and evaluate their effectiveness.
3. Role-playing. Teachers introduce role-taking techniques to foster empathy with the characters in the computerized scenarios and to concretely illustrate the social conflict issues.
4. Group discussions. Small group or classroom discussions are conducted to generate shared awareness of interpersonal issues.
5. Homework assignments. Self-observations and individualized self-control modification tasks provide opportunities for self-assessment and practice of learned skills.
6. Other aids and illustrations. Computer interactions are structured, with efforts devoted toward clearly defining problems and goals. In order to facilitate understanding of abstract concepts, the use of printouts and illustrations facilitates optimal comprehension and conceptualization.

The teachers training promoted their skills in assessing students' individual needs and to adapt the programs to the particular needs of students in various special education environments, focusing on efficient cognitive and behavioral strategies to enhance self-control, such as internal monologues, self-guided questioning, and self-reinforcement. The training also aims to increase teachers' awareness of the children's social world in terms of the sense of loneliness and/or social rejection and of mastery in effective methods to cope with these difficulties.

Figure 2
What is Happening to Me? - The English translation of the screen image in Figure 1

[The student is asked to recall a recent social conflict and to tell the computer about it:]

What happened? With whom? _____
Where did you encounter the problem?
(School, Home, Friends, Work, Other)
How difficult was the problem? (1-4)
What did you feel? (check off from the following list, Other _____)
Did you tell someone? Who? _____
In what ways did you think of solving the problem?
(check off from the following list, Other _____)
What did you do in the end? _____
What happened in the end (what was the result)?
_____
Are you satisfied with the result? (1-4)
[If the answer to the above was no, the computer responds with:]
You were dissatisfied to a (1-4) extent with how the problem ended. What do you think would be worthwhile to do in order to be satisfied?
_____
Here is the record of your problem:

Awareness to the possibility that the students may learn social behaviors (say the "right answers"), but not able to use their newly acquired social knowledge for controlling their behavior, transfer and generalization of learned skills were included in the training. The problems met in the computer-assisted tasks were consistently related to daily real-life difficulties encountered by the students in school and after-school. In order to promote self-monitoring, students reported in classroom discussion, on a weekly basis the conflicts and solutions that they encountered (using the "What's Happening to

Me" software as a structure). The following five studies will present the impact of the interventions. The first three reports will discuss the intervention outcomes for children with mental retardation, using different measures and statistical analyses. In the fourth and the fifth studies comparisons among different groups of students with special needs will be used to identify its differential impacts.

Study 1
(Margalit & Weisel, 1990)

The first study was conducted at a junior-high special education school for students with mild mental retardation. A total of 12 students (8 males and 4 females) with ages ranging from 14.6 to 17.6 years and WISC-R scores ranging from 60 to 75, who were noted for their behavior and social difficulties in addition to their mental retardation participated in the training. The students were trained by Tel-Aviv graduate students for ten 45-minute sessions to solve school-related scenarios. The results compared the pre/post scores of the students' social learning questionnaire, using a Wilcoxon Matched-Pairs Signed Ranked Test ($T=4.5$: $n=12$, $p<.05$), and demonstrated that the students improved their social understanding as examined by two measures: a software measures (a new computer simulation) and a paper and pencil questionnaire. The three reported case studies further clarify the individual learning style of the students, as assessed through teachers and self reports. In addition, the discussions with teachers following the training pointed out the need for a more active involvement of the teachers in the instruction of the students in order to promote generalization into classroom behavior.

Study 2
(Margalit, 1991)

The sample consisted of 87 students (58 males and 29 females) with mild mental retardation from two regional special schools in the central area of Israel with ages ranging from 10.6 to 17.11 years (Mean= 14.0, SD = 2.33). Placement in these settings was based on comprehensive psychological and educational assessments, with WISC-R IQs within the range of 60 to 75. The students evidenced disruptive behaviors, ADHD, oppositional disorders and noncompliance with school demands (DSM III-R, 1987), in addition to their academic failure that prevent their mainstreaming in regular classes. The students were randomly divided by their teachers into two groups: the experimental group, consisting of 46 students (29 boys and 17 girls) who were trained on the social skills program, and the control group, consisting of 41 students (29 boys and 12 girls) who received various academic computer software programs such as drill and practice, structural writing instruction, and wordprocessing. Both groups of students were trained by their teachers in the school's computer laboratory during a 7-month period, twice weekly for a 1-hour duration. The dependent measures consisted of two information source: students' self-reported social skills (Gresham & Elliott, 1990), and teachers' ratings of Task Orientation (Schaefer & Edgerton, 1978) and Aggressive Behavior (Margalit, 1985). No significant differences were found between the two groups prior to training with regard to age, gender proportions, or the variables studied.

In order to control possible differences at the pre-test level, separate MANCOVAs were performed for each source of information, using the pre-test scores as covariates. The results of the experimental/control comparisons revealed that the trained group of students performed significantly better than did the experimental group on the post-test variables. The trained students were rated by their teachers as demonstrating better adjusted task orientation behavior and less aggression and behavior difficulties. In addition, the trained students viewed themselves as demonstrating more cooperative and assertive behaviors, but the self-control and empathy measures did not add to the differentiation between groups.

This subjective self-report is of special interest in view of the feedback received from teachers after the intervention. When asked to evaluate their training and student learning, all of the teachers reported that the majority of students had increased their social understanding and behavior adjustment, but pointed out that several students continued to show difficulty in controlling their anger and acting out behavior. They felt that more focused training was necessary in order to acquire efficient self-control strategies.

Study 3
(Margalit, 1995)

This study differed from the second study in three major aspects: The loneliness experience of the children was examined, peer evaluation was included as an additional source of information, and following the conclusions of Study 2, teachers' instruction included an emphasis on promoting students' self control and self monitoring of disruptive behaviors.

The sample consisted of 73 students (43 males and 30 females) from seven special schools for students with mild mental retardation, with ages ranging from 11.0 to 15.00 years (M = 13.3, SD = 0.85). The sample was divided into two groups: 38 students (24 boys and 14 girls) from four schools were defined as the experimental group that underwent training using the social skills program, and 35 students (19 boys and 16 girls) from three schools constituted the control group whose teachers were unable to participate in this year's experiment but were promised to participate in the following year's training procedures. No significant differences were found between the two groups with regard to gender proportions, age, identification of schools by supervisors of the Ministry of Education, students' level of functioning, or various pre-training study measures.

The training was conducted over a 3-month period, with 1-hour sessions twice weekly in groups of four or five children. The control group visited the computer laboratory for the same durations of time as did the experimental group, but worked on enhancing their writing and keyboard skills using a word processor.

Three sources of information were used in this study: students' self-reported feelings of loneliness (Asher, Parkhurst, Hymel & Williams, 1990) teacher ratings of students' social skills (Gresham & Elliott, 1990) and disruptive behavior (Margalit, 1985); and peer ratings of social acceptance (Andrasik & Matson, 1985; Taylor, Asher, & Williams, 1987). Additional information about the instruments is included in the appendix.

Data were analyzed using a 2 X 2 X 2 (Grouping by Gender by Time) Multivariate Analysis of Variance (MANOVA) with pre-post training scores as the repeated measures, to compare the effect of training between groups. Significant main effects were found for gender ($(F(6,41)=4.01, p<.01)$, and for grouping by time interaction ($F(6,64)=3.27, p< .01$) and not for the main effects of grouping, time, or other interactions. The univariate analyses revealed increased levels of social skills, less disruptive behavior, and more peer acceptance among the experimental group following the intervention. No significant differences were found in the students' sense of loneliness.

The students in the experimental group were rated by their teachers as demonstrating less disruptive behavior and more initiative, better cooperation abilities, and more effective self-control than did their peers who were not trained. The peer acceptance measure further supported these results, revealing that even peers rated the trained students as more socially accepted. Overall, the evaluations by adults and peers demonstrated that students who underwent training with special awareness to self control skills improved their social interactions, and were less disruptive in their classroom behavior.

Spitzberg and Hurt (1987) found in their study that individuals who show poor interpersonal competence are at greater risk of experiencing loneliness. In our study, despite the indications of improved social competence, changes were not found following the intervention in these students' self-reported loneliness. Although the trained students were viewed by others as exhibiting better social interactions and more adaptive behavior, their loneliness experience did not differentiate between groups.

This subjective self-report is of special interest, focusing attention onto an area neglected by most social training programs. These changes may need more time or may be related more to home than to school. The teacher interviews highlighted additional aspect. Although all of the teachers reported their satisfaction with the training, reporting their developed efficacy in promoting students' strategies for improved self-control, they described their uncertainty as to the inner feelings of their students. They suggested the need for additional, more specific training in effective strategies for coping with the loneliness in school and during leisure periods.

In addition, a similar incongruity between performance and self-evaluation has already been reported in earlier research (Vitkus & Horowitz, 1987) focusing interest at the individual's social role and reputation among peers. In the present study, it may be assumed that once these students accepted the role of lonely individuals who lack satisfactory interrelations, they need a focused instruction in order to enable to change this role. More research is needed focusing on self-evaluation of social roles, attempting to develop empowering strategies to develop the child's awareness of his or her new skills.

Study 4
(Margalit, Ankonina & Al-Yagon, 1992)

The goal of the present study was to examine the social competence and peer acceptance among two groups of students with special needs (students with learning disabilities and students with mental retardation), and investigated the effects of a computer-supported social skills training intervention on both groups.

The sample consisted of 96 students (57 males and 39 females) from self contained classes in 10 Israeli regular schools, with ages ranging from 10.6 to 15.0 years (Mean = 13.02, SD = 1.28). Following the students' academic failure and disruptive behaviors, they were placed in five special classes for students with LD and five classes for students with MR. Their WISC-R scores ranged from 75 to 105 for the LD group, and from 60 to 75 for the MR group. Their classes were small, consisting of 8-10 students in each setting. They were divided into two groups: 48 students with learning disabilities (LD) and 48 students with mild mental retardation (MR). No significant differences were found between the two groups' gender ratios or ages.

The intervention was performed by ten experienced special education teachers during regular class hours in each school's computer laboratory, according to the intervention described above. Following the findings of the third study, teachers were trained in empowering their students to cope with loneliness experiences, and attempt was also made to identify the differential impacts of the intervention for different groups of students.

Three sources of information were used: Students' self-reported social skills (Gresham & Elliott, 1990) and feelings of loneliness (Asher, Parkhurst, Hymel & Williams, 1990) teacher ratings of students' social skills (Gresham & Elliott, 1990) and disruptive behavior (Margalit, 1985); and peer ratings of social acceptance (Andrasik & Matson, 1985; Taylor, Asher, & Williams, 1987). The description of the instruments is provided in the appendix.

The training procedure were similar to Study 3. A repeated measure MANOVA was performed with the repeated measure as within subject measure (time: before/after training), and the grouping (LD/MR) and gender (male/female) as the between-subject measures. In addition, two hierarchical multiple regression analyses were conducted to examine the variables hypothesized as predicting social skills before and after training.

The results demonstrated that, prior to intervention, only peer acceptance differentiated between groups: Students with learning disabilities were rated by their peers as less socially accepted when compared to students with mental retardation. Teachers' ratings for both groups were not different regarding social skills and levels of disruptive and hyperactive behaviors. The study of loneliness feelings revealed unique interrelations, with LD boys demonstrating less loneliness than MR boys, and LD girls expressing more loneliness than their MR peers. Before training, boys of both groups were rated by their teachers as functioning at a lower level of social competence and as demonstrating more disruptive behaviors than were girls. Following the intervention, teachers viewed the students of both groups as demonstrating better social skills, and peers expressed higher levels of acceptance. In addition, a distinct grouping effect of the training was found in the teachers' ratings of hyperactive and disruptive behaviors. The students with mental retardation were viewed by their teachers as demonstrating a clear decrease in acting-out behaviors following the intervention, whereas the group of students with learning disabilities demonstrated a more moderate change. A possible interpretation of these findings would be that the disruptive behavior of students with mental retardation may be initially reactive to their academic failure, and the impact's training was greater, whereas the behavioral difficulties of the second group may be more stable.

Two sets of hierarchical multiple regression analyses were conducted, one with teachers' pre-training social skills ratings as the dependent variable and the other with teachers' post-training social skills ratings as the dependent variable. For both analyses, identical independent variables were entered in the following order: grouping (LD/MR), gender, and age entering as the first block to control for demographic variables, followed by self-reported social skills, peer acceptance ratings, hyperactive behavior, and feelings of loneliness. In addition, for the analysis of teachers' post-training social skills ratings, the teachers' pre-training social skills ratings were entered directly after the demographic variables.

The results indicated that before the intervention, teachers' ratings of their students' social skills were significantly predicted by grouping and by gender but not by age (with MR students and male students revealing lower scores), accounting for 10% of the variance, by peer acceptance (positively related and adding 9% to the prediction), hyperactive behavior ratings (negatively related, adding 17% to the prediction), and feelings of loneliness (negatively related, adding 4% to the prediction). The self-reported social skills measure was not a significant predictor in this regression analysis. The seven variables accounted for a total of 47% of the variance, reaching a multiple correlation of .69. These results demonstrated that students who were more accepted by their peers, evidenced less hyperactive behavior, and felt less lonely were viewed by their teachers as more socially competent.

Following the intervention, teachers' ratings of their students' social skills were significantly predicted by the

BEST COPY AVAILABLE

teachers' pre-training social skills ratings (positively related, accounting for 50% of the variance), by the students' self-reported social skills (positively related, adding 8% to the prediction), and hyperactive behavior ratings (negatively related, adding 2% to the prediction). Demographic variables, peer ratings, and feelings of loneliness were not significant predictors in this regression analysis. The seven variables predicted a total of 61% of the variance, reaching a multiple correlation of .78.

These results demonstrated that the level of social skills rated by teachers before training was the best predictor for teacher-rated functioning following intervention. In addition, students' higher self-reported social skills and lower hyperactive behavior ratings added to the prediction of increased social skills according to their teachers. Following training, the demographic variables, feelings of loneliness, and peer acceptance lost their significance in the regression equation. The best prediction for social competence after the intervention was attained by the teachers' pre-training scores, with the self-reported ratings and hyperactive behavior measures significantly adding to the prediction. Students who initially viewed themselves as more socially competent, and who were initially seen by their teachers as more socially proficient and less hyperactive, achieved higher levels of competence following training, suggesting their greater ability to benefit from the training. It should also be noted that the clear difference found before training between LD and MR groups, and between boys and girls, was not significant following the intervention.

Study 5

(Margalit, 1994)

The aim of this study was to compare the outcome of the social skills training within a subtyping approach, for two groups of students: Those with learning disabilities (LD) and those with behavior disorders (BD). Research pointed out at the inconsistent results in differentiating among students with learning disabilities and behavior disorders in behavioral, cognitive and academic functioning (Margalit, 1989; Vaughn & La Greaca, 1992). The problem of heterogeneity within the LD and BD fields has been widely acknowledged, leading to attempts to organize the differences into meaningful subgroups (Hooper & Willis, 1989; Kavale & Forness, 1992; Margalit, 1993; Seigel & Metsala, 1992). When heterogeneous groups of LD and BD students were subtyped using the disruptive behavior and the experience of loneliness as their criteria, four different unique social profiles emerged (Margalit, 1993).

The sample consisted of 114 male students, divided into two groups: (a) 52 students with LD from eight mainstreamed classes for LD students, with ages ranging from 11.0 to 15.0 years (Mean = 12.23, SD = 1.12); and (b) 62 students from six mainstreamed classes for BD students, with ages ranging from 11.0 to 15.0 years (Mean= 12.53, SD = 1.34). No significant differences were found with regard to their ages or intellectual functioning. WISC-R scores for all the subjects were over 75. Placement resulted from the students' inability to remain in regular classes for more than a few hours a week. For the LD group, this resulted initially from severe, continued academic failure which as also accompanied by disruptive behavior. For the BD group, severe, chronic behavior difficulties, opposition, and aggression led to the special placement.

Three sources of information were used: teacher ratings of students' self control, externalizing and internalizing behavior difficulties (Gresham & Elliott, 1990), students' self-reported feelings of loneliness (Asher, Parkhurst, Hymel & Williams, 1990), and peer ratings of social acceptance (Andrasik & Matson, 1985). A description of the instruments is provided in the appendix.

The training was conducted over a 3-month period, similarly to the earlier studies. The data were analyzed using a 2 X 3 X 2 (Grouping (LD/BD) by subgroups (2/3/4) by Time (pre/post) Multivariate Analysis of Variance (MANOVA) with repeated measures (Time), to compare the effect of training between groups. In line with loneliness and externalizing maladjustment subgroups'

Table 1
Descriptive statistics on the four subgroups

	Subgroup			
	1	2	3	4
No. of students	31	26	25	32
Loneliness range	16-35	18-36	37-69	37-60
Externalizing range	0-7	8-12	0-7	8-12
LD students	17	9	12	14
BD students	14	17	13	18

conceptualization (Margalit, 1993), four subgroups were identified based on the mean scores of loneliness and externalizing before training as can be seen on Table 1: Subgroup 1, relatively adjusted students; Subgroup 2, Externalizing and not lonely students; Subgroup 3, Lonely and not externalizing students; and Subgroup 4, Lonely and externalizing students. Since Subgroup 1 was relatively socially adjusted, this subgroup was excluded from the analysis. The new sample for analysis consisted of the three remaining subgroups (2/3/4) 83 students (35 LD and 48 BD).

No significant differences were found between the groups, or the interaction of groups by subgrouping before training. The pre-test/post-test comparisons revealed significant differences for the two measures: Loneliness and peer acceptance. As can be seen on Table 2, following interventions, the students rated themselves as less lonely and more accepted by peers. The comparisons of the teachers ratings (see Table 3) also revealed significant differences for three measures: Following interventions, the students as a group were rated as less demonstrating Externalizing and Internalizing maladjustment behaviors and having more self-controlled skills.

The analysis of the three subgroups comparisons pointed out that students in Subgroup 2 (who initially demonstrated externalizing maladjustment, and lower self control skills), were rated following intervention as more accepted by peers, more self-controlled, and less demonstrating externalizing maladjustment.

Students in Subgroup 3 (the most lonely and the least accepted by peers) following intervention were rated as

Table 2
Means, Standard Deviations and F scores of the loneliness and peer acceptance , pre/post comparisons

	Subgroup 2	Subgroup 3	Subgroup 4	F(subgrouping)	Total
	n=26	n=25	n=32	(2,77)	(n=83)
Loneliness					
Pre-Mean	29.42	46.60	44.31	27.79**	40.33
SD	5.63	7.00	6.70		9.84
Post- Mean	31.69	40.32	40.06		37.52
SD	10.05	10.55	10.76		11.08
Peer Acceptance					
Pre-Mean	2.99	2.89	2.99	1.38	2.96
SD	0.65	0.97	0.82		0.81
Post- Mean	3.56	3.02	2.92		3.15
SD	0.92	0.80	0.88		0.89

*p<.05, **p<.01

less lonely and more accepted by peers. The second of lonely students (subgroup 4) were initially noted by their behavior difficulties. Teachers rated them as demonstrating externalizing difficulties and lower self-control, and peer acceptance. Following intervention they viewed themselves as less lonely, yet no significant differences were found in their peer acceptance. Teachers rated them as less demonstrating externalizing maladjustment following intervention, and demonstrating increased self-control.

The externalizing and internalizing maladjustment measures pinpointed attention at the LD/BD subgrouping differences. The pre/post comparisons revealed a decreased externalizing and internalizing maladjustment for the BD students on Subgroup 2 (Externalizing) and the LD students in subgroup 4 (Externalizing and Lonely), on their externalizing maladjustment. As for Subgroup 3 (Lonely), a decreased of their internalizing maladjustment for the LD students was found, and an increase in externalizing maladjustment for the BD students.

The results of this study demonstrated the differential impact of the intervention program for the different

Table 3
Means, Standard Deviations and F scores of the teachers' ratings

	Subgroup 2		Subgroup 3		Subgroup 4		F	Total
	LD	BD	LD	BD	LD	BD	(2,77)	n=83
	n=9	n=17	n=12	n=13	n=14	n=18		
Externalizing								
Pre-Mean	9.67	9.71	4.08	4.15	10.21	10.72	69.16**	8.33
SD	1.41	1.31	2.31	2.85	1.37	1.36		3.31
Post-Mean	9.55	6.71	5.33	5.39	6.36	9.83	4.61*	7.23
SD	2.35	1.72	3.47	3.20	3.50	2.23		3.25
Internalizing								
Pre-Mean	3.44	6.29	8.83	5.69	4.50	6.83	7.96**	6.07
SD	3.84	2.80	2.17	3.20	2.90	3.29		3.34
Post-Mean	3.33	4.11	7.08	6.39	4.36	5.94	3.38*	5.25
SD	4.06	2.18	2.78	3.12	3.67	3.13		3.28
Self-Control								
Pre-Mean	7.11	7.47	10.50	12.54	6.57	6.00	12.32**	8.19
SD	3.58	4.24	3.80	3.64	3.80	4.52		4.55
Post-Mean	7.44	8.41	11.08	11.77	9.71	7.50	1.85	9.24
SD	2.70	3.89	4.70	4.78	4.73	3.84		4.39

*p<.05, **p<.01

subgroups of children. The increase of the adjustment measures for both groups of children should not be ignored, yet the subtyping approach helps to pinpoint the differential impact for the different subgroups of children. In order to promote their social growth the intervention planning has to include individualized approach to meet the unique needs of different subtypes of children. An emphasis on self-control strategies is extremely valuable for the students in Subgroup 2. Students in Subgroups 3 and 4 need emphasis on instruction to cope with loneliness.

The current study further substantiated Fessler, Rosenberg, and Rosenberg's (1991) study confirming the distinction between characteristics of the two diagnostic categories studied here: the students with LD and BD. However, a possible overlap between the two categories should not be ignored. It seems that some of the children who demonstrate behavior disorders may also have learning problems, just as youngsters with learning disabilities often manifest behavioral difficulties. Further investigation of these diagnostic categories will help identify the topology of both groups and guide their intervention planning.

Discussion and Conclusions

This chapter presents a computer-assisted social skills learning program, and the outcome research in an attempt to demonstrate the use of technology within intervention programming. The computer was used here as a controlled mini-environment for experimenting and rehearsing social conflicts, and promoting effective strategies. The five summarized studies represent only part of the on-going comprehensive research, and were used to demonstrate the interrelations existed between the program development and research findings. Three sources of information were used to evaluate the program: students' self reports, peer ratings and teachers' perceptions. Detailed descriptions of the procedures are provided in the research reports of each study cited above.

The first three studies focused attention on students with mental retardation, and demonstrated within an experimental/control design the impact of the computer assisted instruction. Various aspects such as promoting social skills and empowering students to cope with their loneliness were emphasized in the intervention programming following the research conclusions. Studies 4 and 5 were included in this report in order to demonstrate the move from evaluating the change in one group of disabilities to comparisons of several trained groups and subgroups.

Finally, more research is needed to explore the impact of variables such as length of training, generalization planning, and maintenance periods. More detailed investigations of the process and product for different groups of students, using varied evaluation methods may further promote the individualized programming. The encouraging data presented in this manuscript focus interest on expanding social skills training and incorporating new means and procedures; however, careful, intensive investigation of their efficacy within different school environments are needed.

An additional line of future research might explore the possibility that subjective loneliness and social isolation experiences have been developed during early childhood and thereby would be resistant to change incurred by a relatively short-term intervention. The implications of this assumption call not only for long-term interventions, but also may lead researchers and practitioners toward the development of preventative steps to foster early learning of efficient strategies for coping with social isolation, and by developing environments that promote social interrelations, and companionship (Andersson, Mullins, & Johnson, 1987).

In this work, the research results focus interest at expanding the social skills training program to incorporate new technologies into intervention programs, in line with Vaughn and La Greca (1992) recommendations to adapt interventions to students' unique needs. The importance of accompanied research was demonstrated, without neglecting the unique role of special educators in designing individualized programs, and awareness to the subjective world of the students with special needs.

A limitation that should not be ignored is that the software development and the various studies were all performed in the Israeli school system. Additional international research is needed to examine the unique meaning of social competence and disruptive behaviors in different cultures and contexts. Only through international collaborations of researchers, program developers and educators, will the conceptualization of social skill intervention be enhanced. Future international research and development should be directed to exploring means to adapt technology for promoting the growth of children with special needs in different countries, and their unique local adaptations for different cultures and educational systems.

References

Andersson, L., Mullins, L. C., & Johnson, D. P. (1987). Parental intrusion versus social isolation: A dichotomous view of the sources of loneliness. In M. HoJat & R. Crandall (Eds.), Loneliness: Theory, research and applications (Special Issue). *Journal of Social Behavior and Personality*, 2, 125-134.

Andrasik, F. & Matson, J. L. (1985). Social skills training for the mentally retarded. In L. L'Abate (Ed.), *Handbook of social skill training and research* (pp. 418-453). New York: John Wiley.

Asher, S. R., Parkhurst, J. T.,Hymel, S., & Williams, G. A. (1990). Peer rejection and loneliness in childhood. In S. R. Asher and J. D. Coie (Eds.) *Peer rejection in childhood* (pp. 253-273). Cambridge University Press: New York

Deshler, D, D., Alley, G. R., Warner, M. M., & Schumaker, J. B. (1981). Instructional practices for promoting skill acquisition in severely learning disabled adolescents. *Learning Disability Quarterly, 14*, 415-421.

Elliott, S. N., & Gresham, F. M. (August, 1989). *Preschoolers' behavior and family background: Teachers' and parents' assessment*. Paper presented at the Annual Convention of the American Psychological Association, New Orleans, LA.

Fessler, M. A., Rosenberg, M. S., & Rosenberg, L. A. (1991). Concomitant learning disabilities and learning problems among students with behavioral/emotional disorders. *Behavioral Disorders, 16*, 97-106.

Glaser, R. (1984). Education and thinking: The role of knowledge. *American Psychologist, 39*, 93-104.

Gottlieb, J. & Leyser, Y. (1981). Friendship between mentally retarded children. In S. R. Asher & J. M. Gottman (Eds.), *The development of children's friendships* (pp. 150-181). New York: Cambridge University Press.

Gresham, F. M. & Elliott, S. N. (1990). *Social Skills Rating System* (SSRS). Circle Pine, MN: American Guidance Service.

Gresham, F. M., & Reschly, D. J. (1986). Social skill deficits and low peer acceptance of mainstreamed learning disabled children. *Learning Disabilities Quarterly,9*, 23-32.

Grossman, H. J. (1973). *Manual on terminology and classification in mental retardation*. Washington, DC: American Association on Mental Deficiency.

Hasselbring, T. S., (1988, January). *Effective computer use in special education: What does the research tells us*. Paper presented at the Annual CEC/TAM Conference on Special Education and Technology, Baltimore, Maryland, U.S.A.

Hensen, D. J., Watson-Perozel, M., & Christopher, J. S. (1989). Clinical issues in social-skills training with adolescents. *Clinical Psychology Review, 9*, 365-391.

Hooper, S. R., & Willis, W. G. (1989). *Learning disability subtyping*. New York: Springer-Verlag.

Horowitz, L. M., & Vitkus, J. (1986). The interpersonal basis of psychiatric symptons. *Clinical Psychology Review, 6*, 443-469.

Irvin, L. K., & Walker, H. M. (1993). Improving social skills assessment of children with disabilities: Construct development and applications of technology. *Journal of Special Education Technology, 12*, 63-70.

Kavale, K. A., & Forness, S. R. (1992). History, Definition, and Diagnosis. In N. N. Singh & I. L. Beale (Eds.) *Learning disabilities: Nature, theory and treatment* (pp 3-43). New York, Springer-Verlag.

Kramer, J. J., Piersel, W. C., & Glover, J. A. (1987). Cognitive and social development of mildly retarded children. In M C. Wang, M. C. Reynolds, & H. J. Walberg (Eds.), *Handbook of special education research and practice: Mildly handicapped conditions* (Vol. 2, pp.43-58). Oxford: Pergamon Press.

Manning, B. H. (1988). Application of cognitive behavior modification: First and third graders' self-management of classroom behaviors. *American Educational Research Journal, 25*(2), 193-212.

Margalit, M. (1985). Perceptions of parents' behavior, familial satisfaction, and sense of coherence in hyperactive children. *Journal of School Psychology, 23*, 355-364.

Margalit, M (1989). Academic competence and social adjustment of boys with learning disabilities and boys with behavior disorders. *Journal of Learning Disabilities*, 22(1), 41-45.

Margalit, M. (1990a). *I found a solution* [Computer program]. Tel-Aviv: Ramot Tel-Aviv University Press.

Margalit, M. (1990b). *Effective technology integration for disabled children: The family perspective*. New York: Springer-Verlag.

Margalit, M. (1991). Promoting classroom adjustment and social skills for students with mental retardation within an experimental and control group design. *Exceptionality, 2*, 195-204.

Margalit, M. (1993). *Loneliness and social adjustment among students with learning disabilities and behavior disorders: A subtyping model*. Presented at the 15th International Conference of the Council of Learning Disabilities, Baltimore, Maryland, U.S.A.

Margalit, M. (1995). Social skills learning for students with learning disabilities and students with behavior disorders. *Educational Psychology, 15*(4), 445-457.

Margalit, M. (1995). Effects of social skills training for students with an intellectual disability. International *Journal of Disability, Development and Education, 42*(1), 75-85.

Margalit, M., Ankonina, D., & Al-Yagon, M. (1992). *"I Have a Solution" Research report*. Tel Aviv University.

Margalit, M. & Weisel, A. (1990). Computer-assisted social skills learning for adolescents with mild disabilities and social difficulties. *Educational Psychology, 10*(4), 343-354.

Mayer, R. E., (1987). Learnable aspects of problem solving: Some examples. In D. E. Berber., K. Pezdek., & W. P. Banks (Eds.), *Applications of cognitive psychology: Problem solving, education and computing* (pp.109-122). Hillsdale, NJ: Lawrence Erlbaum.

Milic, N., & Aron, A. M. (September, 1991). *Inhibition and impulsiveness its relation with sociometric status and self-esteem in a sample of elementary students of Chilean low social-economic status*. Paper presented at the annual meeting of the International Academy of Research in Learning Disabilities, Cincinnati.

Pearl, R.(1992) Psychosocial characteristics of learning disabled students. In N. N. Singh., I. L. Beale (Eds.) *Learning disabilities: Nature, theory and treatment* (pp 96-125). New York: Springer-Verlag.

Pfeiffer, K., Feinberg, G., & Gelber, S. (1987). Teaching productive problemsolving attitudes. In D. E. Berber., K. Pezdek., & W. P. Banks (Eds.), *Applications of cognitive psychology: Problem solving, education and computing* (pp.99-108). Hillsdale, NJ: Lawrence Erlbaum.

Resnick, H. (1989). *"Busted:" A computerized therapeutic game: Description, development and preliminary evaluation*. Unpublished manuscripts. University of Washington, Seattle.

Schaefer, E. S., & Edgerton, M. (1978). *Classroom Behavior Inventory*. Unpublished manuscript, University of North Carolina at Chapel Hill.

Seigel, L. S., & Metsala, J. (1992). An alternative to the food processor approach to subtypes of learning disabilities. In N. N. Singh & I. L. Beale (Eds.) *Learning disabilities: Nature, theory and treatment* (pp 44-60). New York, Springer-Verlag.

Spitzberg, B. H. & Hurt, H. T. (1987). The relationship of interpersonal competence and skills to reported loneliness across time. *Journal of Social Behavior and Personality*,2(2), 157-172.

Taylor, R. L., Asher, S. R., & Williams, G. A. (1987). The social adaptation of mainstreamed mildly retarded children. *Child Development, 58*, 1321-1334.

Vaughn, S., & La Greca, A. (1992). Beyond greetings and making friends: Social skills from a broader perspective. In Y. L. Wong (Ed.). *Contemporary intervention research in learning disabilities: An international perspective* (pp. 96-114). New York: Springer-Verlag.

Vitkus, J., & Horowitz, L. M. (1987). Poor social performance of lonely people: Lacking a skill or adopting a role? *Journal of Personality and Social Psychology, 52*, 1266-1273.

Woodward, J., Carnine, D., & Gersten, R. (1988). Teaching problem solving through computer simulations. *American Educational Research Journal, 25*(1), 72-86.

Author Note

Further details on the "I Found a Solution" program and on the three adventure stories and the reported studies can be obtained by writing to the author.

Appendix

Instruments Description

Three sources of information were used in the different studies; teacher ratings of students' self social skills and of externalizing and internalizing behavior difficulties, students' self reported feelings of loneliness, and peer ratings of social acceptance.

Social Skills Rating Scales (SSRS). The Hebrew adaptation of the SSRS teacher form and SSRS student form (Gresham & Elliott, 1990; Margalit,1991) were used to assess teachers' ratings of their students' social skills and problem behaviors and the students' self reported social skills. The SSRS was completed on a three point frequency scale (often true (3), sometimes true (2), never true (1)). The scales included social skill areas such as Cooperation, Assertion and self control, with ten items in each scale. Two types of problem behaviors were also rated by the teachers: externalizing, including six items such as "Threatens or bullies others" (alpha = .88); and internalizing, including six items such as "Shows anxiety about being with a group of children" (alpha = .82).

Loneliness and Social Dissatisfaction Questionnaire. The Hebrew adaptation (Margalit, 1994; Asher, Parkhurst, Hymel & Williams, 1990) consisted of 16 primary items and 8 filler items on a five-point Likert scale, ranging from never (1) to always (5), with items such as "I have nobody to talk to in school," "I am lonely at school," and "I have lots of friends in my class." The fillers (e.g., "I like school") covered interest and activity areas and facilitated relaxation and easier disclosure of feelings. The Cronbach alpha score was .86.

Peer Rating Scale. The Hebrew adaptation (Andrasik & Matson, 1985; Margalit, 1991) consisted of a five point Likert scale on which children were asked to rate for each of their classmates, to what extent they like to work and be together with him/her, (1=Not at all, 2=Not much, 3=Doesn't matter, 4=A little, and 5=A lot). The score for each child was standardized by averaging the ratings received from his/her classmates, to permit comparison of scores across classrooms.

Beyond Technological Solutions to Human Problems: The Idonesian System of Care

Judy W. Kugelmass
SUNY Binghamton, New York, USA

A Note to Readers

The report that follows is a departure from others in this monograph. Rather than discussing the application of technology for improving special education services throughout the world, the research to be described demonstrates how an over-reliance on technological models can lead to unanticipated outcomes. The most obvious problem considered when a new technology is being introduced is whether it will be used appropriately, if at all. The mis-application of an innovation may not, however, be the most significant issue to consider when working within the complex of issues that surround providing services to children with special needs and their families. The countless examples in modern history of the ways in which the introduction of scientific "advances" have promoted the decay of effective social systems should also alert us to potential dangers and bring caution to our enthusiasm.

The other countries discussed in this monograph represent Western, industrialized and technologically sophisticated societies. The introduction of computerization into their service delivery systems has therefore not required a major shift in the belief systems of either professionals or client populations. However, even in these cases, the lives of the children being served will be impacted upon in unanticipated ways. For example, I have observed children with physical disabilities lose interest in sustaining social interactions with typical peers as they become more competent at using computers. Certainly, a thoughtful teacher can handle this through the use of more interactive software or by simply limiting the time children can stay "plugged-in." But what about the child's family? Are they computer literate? Will their child's newly developed competence push them even further away from an interactive role as parent and reinforce a sense of inadequacy?

These and other issues can be anticipated and planned for through a thorough examination of the society into which the technological innovation is being introduced and the families the technology is designed to serve. Multi-cultural societies such as the United States present particular challenges that need to be addressed through the development of collaborative relationships with consumers. The information in the report that follows was gathered through these kinds of relationships with both professionals and parents. It demonstrates a process that attempts to avoid mistaken assumptions about shared beliefs and values when developing plans for special education programming, with or without the benefit of computer technology.

When medical and agricultural developments were initially introduced into non-Western cultures many issues needed to be considered to assure that these innovations would be lasting and appropriate. Unfortunately, inadequate attention was given to the complex nature of social systems and the web that surrounds the process of addressing human problems. Technological and medical specialists were often not attentive to the contexts that existed prior to their arrival (Spicer, 1967). The problems they encountered were viewed as "barriers" to be overcome rather than as opportunities to work within systems that had previously served the society. Certainly parents needed to be made aware of medical and technological advances that could help their children. What wasn't anticipated was that the way in which information was provided might lead many parents to doubt their competency (Fewell, 1986; Gallagher, Beckman & Cross, 1983; Turnbull, 1983).

The research that follows demonstrates how some Indonesian parents are turning away from indigenous support systems as they look towards technological and institutional solutions to provide a "cure" for their children. While some have integrated traditional supports with educational, medical and rehabilitative practices imported from Western countries, many are loosing faith or do not recognize the value of the community based systems that have sustained Indonesian families for centuries. The report also demonstrates how the "objective culture" that underlies service delivery systems is a manifestation of "subjective culture." The distinction between these two aspects of culture, as described by Stewart and Bennett (1991), can alert practitioners to the need for a critical examination of the ways in which services for children and families have been designed and the need for appropriate adaptations when introducing technology.

One aspect is subjective culture--psychological features of culture, including assumptions, values, and patterns of thinking. The other is objective culture--the institutions and artifacts of a culture, such as its economic system, social customs, political structures and processes, arts, crafts, and literature. Objective culture can be treated as an externalization of subjective culture which usually becomes reified; that is, those institutions that are properly seen as extensions of human activity obtain an independent status as external entities. They seem to exist "out there," and their ongoing human origins are forgotten(Stewart & Bennett, p.2).

In the United States, the belief in technological solutions to human problems has become an increasingly significant feature of our "subjective culture." We eagerly anticipate and welcome the new artifacts of the culture that offer the promise of personality transformation, eternal youth, the cure for all disease, speed, efficiency, and entertainment. New medications; high speed, high resolution telecommunication systems; and of course, the computer are the idols we worship. It is not surprising then that the institutions designed to educate our children and the rehabilitation and educational systems that support their care have been increasingly focused on these artifacts as providing the answers to previously unsolvable problems.

Medical advances and rehabilitation technologies have clearly provided opportunities to people with disabilities that would not have been imagined even twenty years ago. Higher levels of functioning and independence achieved through mechanization and computerization have improved individual lives in important ways. At the same time, there is an increased recognition that more than technology is required to assure optimal functioning and a positive quality of life. Medical, rehabilitation and educational professionals are acknowledging the significance of spiritual, emotional, psychological and social factors in the healing and rehabilitation process. This report supports that perspective and offers evidence for the necessity of introducing culturally appropriate technology in a manner that supports the functioning of social systems.

Research Design

During the summer of 1990, through the support of a World Rehabilitation Fund, International Exchange of Experts and Information in Rehabilitation (IEEIR) fellowship, I returned to the island of Java, Indonesia in order to better understand the ways in which "culture" impacted on the delivery of services to children with disabilities and their families. I had become familiar with the history and culture of this fascinating country through a Fulbright Summer Seminar study-visit program during the summer of 1989. During that earlier study-visit, I met several educational and health-care professionals, academics and parents of children with disabilities. My new Indonesian friends were eager to have me visit their schools and rehabilitation facilities and encouraged a return visit so that I could better understand their country and assist in their development of special education services. My return visit would also help develop my understanding of the impact of "culture" on providing these services to children and their families.

A qualitative/ethnographic research design was selected for the study, both because of the questions to be

addressed and the kind of flexibility that was necessary when working in a non-Western, developing nation, such as Indonesia. The interview process was guided by a model of family assessment proposed by Dunst, Trivette, and Deal (1988), and grew out of ecological theory (Bronfenbrenner, 1977; Garbarino, 1982). Based on the understanding that all social systems operate in interaction with one another to maintain the values, beliefs, and ideologies that drive every society, ecological theory assists in understanding the possible impact of interventions on children and the systems in which they operate. In order to understand the ways in which these systems interact with one another and their impact on the child, sub-systems are identified and described through conversations with family members and participant observations. These sub-systems include the family "micro-system," i.e., the most immediate social and physical environment of the family; the "exosystems," or formal and informal organizations outside of the family that impact on it; the societal "macrosystem," surrounding the family and composed of the values, beliefs, and ideologies. The relationships that existed between the several sub-systems form an additional sub-system, the "meso-system."

The study was initially designed to develop ten, systematic, case-studies of children identified as "mentally handicapped" who were receiving specialized services and living at home. Following the original research design, however, required significant information from school and medical records, to be supplemented by interviews with teachers, parents and other professionals, and observations of the children in their schools and homes. After reviewing the records of the first three children whose parents agreed to participate, it became apparent that it would not be possible to gather objective data from school records that could be considered valid indicators of the child's abilities or functioning, using quantitatively based, Western research and assessment standards. Although there were endless numbers of forms and complex record keeping systems in official files, they contained very general statements and used no clear criteria for identification, placement , or program, planning. "Mental retardation" and "mental handicaps," the disability designations of the children involved in the study, were not clearly defined. Rather, the classification of children in Indonesia was determined by the psychologist's subjective evaluation and the use of direct translations of culture bound, standardized tests of intelligence, such as the Stanford-Binet and the Wechsler Scales.

My belief that the student files were of little value because they did not represent "scietifically" derived data was the first of several culturally inappropriate judgments I would make. I failed to recognize that they demonstrated the significance of form and appearance in Javanese society. Looking "official" lent validity and authority to the information and gave parents confidence in the competency of the staff and their educational programs. The files themselves were rarely used. Similarly, the use of IQ tests identified as culturally biased within the United States, represented the belief that applying Western technology could improve the services provided to children. In spite of the growing understanding among Indonesian psychologists of the limitations of standardized tests and culture bound assessments, the reliance on approaches used in American and European social science and education in making clinical judgments continued. The imitation of Western practices and styles pervaded many aspects of Indonesian society and demonstrated an attempt to import technologies into a "subjective culture" that was based on very different assumptions, values, and patterns of thinking than the culture from which they originated.

The problems encountered in gathering "valid" and "reliable" data on the children led to a shift in the focus of the research away from a case-study approach. Instead, I followed a more open-ended and anthropological design that would lead to understanding the perspectives of parents regarding their children's functioning and families' adaptations to children's disabilities. Regardless of etiology or differential diagnoses that might be applied in the West, the fact that these children were officially designated as "mentally handicapped" within Indonesian society indicated that they were perceived as deviant. It could therefore be assumed that demands would be put on their families that were different than those of families with more typical Indonesian children.

Table 1 describes the children whose families were interviewed using general disability designations that will hopefully be more meaningful than those indicated in the child's records (The terms "idiot," "imbecile," and "moron" are still used in Indonesia.

Table 1
Children (n=14) by Age and Disability Designation

Ages	Disability Designation		
	Down Syndrome	Autism	L.D or Mild M.R.
4-6	0	0	3
7-10	2	1	1
11-15	1	0	3
16-21	0	2	1

The Interview Process

In studying aspects of a society as different from one's own as Indonesia is from the United States, it is essential to have cultural collaborators to served as both language and cultural translators. Working collaboratively with a social worker and experienced field researcher, Mr. Amrullah, and a professor of developmental psychology from the Padjadjaran University, Dr. Kudswiartri Setiono, added dimensions to the research that might have otherwise been overlooked. Our collaboration informed the research methodology as well as subsequent interpretations of the data and was essential for accurate and complete understanding.

Conducting interviews through a direct question/answer format would have been inappropriate in this cultural context. In Java, it is considered rude to ask a question directly. Respondents will also not answer in a direct or completely truthful way, out of fear of offending through disagreement. Only through a circuitous route of informal conversation and reading between the lines, with the assistance of my cultural translators, were we able to get close to the true feelings of the Sundanese and Javanese parents with whom I met. One indication that we arrived at deeply held feelings and attitudes became apparent when parents stopped talking in the official language of Indonesian, and instead spoke in their respective ethnic dialects. This occurred consistently, after a general introduction by Mr. Amrullah , followed by an informal, but guided conversation that was tape recorded. The main points of the discussion were translated to me, on-the-spot. They would be followed by suggestions for additional probes. The interviews lasted anywhere from one to two hours each and were subsequently translated and transcribed by Mr. Amrullah and myself.

Meetings with parents took place in the family home and, in three instances, in the child's school. In addition, there were opportunites for informal interactions with several of the families at social gatherings and dinners. Families were asked to describe themselves and both formal and in-formal support systems that made up their social worlds. The perceived strengths of each and the resources they provide were also identified by the family, as were the unmet needs of the family system. The responses were then organized following the ecological model proposed by Bronfebrenner (1977).

This ecological "mapping" provided a clear picture of the sub-systems in which the family operated and the impact of having a child with a disability on each of these. It also clarified the responses of the family and society to the child. That information will be presented through a summary of the data, collapsed into the appropriate ecological sub-systems.

The Indonesian Macrosystem

Indonesia, the fifth most populous nation in the world, is an archipelago of more than 13,000 island, only 6,000 of which are inhabited, It is located in Southeast Asia, on the equator, where the Indian and Pacific Oceans meet the South China Sea. Although its official language is Bahasa Indonesia, its people come from approximately 300 distinct ethnic groups and speak between 250 and 400 languages or regional dialects What binds this country together is a relatively new political structure, which grew out of a long colonial history. It was not until 1949 that the Dutch East Indies became the Federal Republic of Indonesia. In 1965 a civil war replaced its first president, Sukarno. In 1966, the current president, Suharto, took control of the country, and established what became known as the "New Order" (Dalton, 1988; Dept. of Information, Republic of Indonesia, 1988).

Although many Indonesians acknowledged the repressive aspects of the government, there was generally a widespread support for its leaders. Certainly this reflects the cultural norm of respecting authority and avoiding conflict but there was a general agreement among the people with whom I interacted, that the countries' economic and social conditions had improved. In spite of this, Indonesia is among the poorest of developing nations. The economic disparities seen among the families that participated in the study, with some owning two or more houses, cars and several servants, and others living in small, crowded quarters, without indoor plumbing, appears to be typical of Indonesian society.

The Indonesian government has direct control over industrial and technological development and social planning, through a huge and often inefficient bureaucracy. As witnessed in educational and social programs, a good deal of attention is given to the appearance of order and progress in economic and social endeavors. The attention to appearances represents a pervasive value among the Javanese, who are the largest ethnic group among the nation's government leaders. Through the motto of "Unity Through Diversity," and the state ideology of "Pancasila," the Suharto government has attempted to bring about an image, if not the reality, of an ordered, uniform society, and a modern nation.

Religion and spirituality are central aspects of Indonesian public and private life. Registration in one of the

five acknowledged, formal religions (Islam, Buddism, Hinduism, Catholocism, Protestantism) is required by law. However, religious practices in Indonesia often incorporate several religious traditions, blended together into syncretic belief systems, integrating mysticism and spirit worship with orthodox religious teachings. The formal religious instruction required in all schools rarely matches the real world beliefs or practices of children and their families.

The spiritual beliefs that were expressed by all but two of the parents interviewed, came from a blending of Indonesian values with Islamic and mystical religious beliefs (Two families were ethnic Chinese and operated under a value system that was somewhat different, although equally important. They were guided by a Confucian/Christian ethic, blended with Indonesian cultural considerations.) The set of values that underlie the belief systems of these parents have been described by Fitch and Webb (1989) as those basic to Indonesian life. These are:

1. Wisdom always comes from experience.
2. Change is possible, but one cannot change one's destiny.
3. Duties of office are predetermined and one must accept them and act accordingly.
4. Everything has its place in the universe according to one's status and morality. One must do what is appropriate and avoid what is not.
5. People should know their place and task. (Fitch & Webb, 1989)

Bandung: The Setting of the Study

All the families interviewed reside in the city of Bandung. With 1.7 million people, Bandung is the third largest city in Indonesia. Located in west Java, 100 miles south east of the capital city of Jakarta, it lies in a high valley, surrounded by tea plantations and well cultivated agricultural land. It was once considered to be the "Paris of the East," because of its tree lined avenues, European architecture, rich cultural life, and numerous colleges and universities which provided a rich political, intellectual, and artistic environment (Dalton, 1988). In addition to the youthful atmosphere of the city, Bandung is also the recognized center of Sundanese cultural life, offering a rich and unique tradition of ethnic music, dance and art.

Bandung is not, however, the quaint city once described in the guidebooks. Many of the older, Dutch buildings have fallen into disrepair. American style, mass-market "mall" culture now competes with Sundanese food shops, ethnic music, and open air markets. Western youth culture has invaded all of Southeast Asia and is most apparent in this city, with its thousands of students. The most devastating consequence of the invasion of Western technology in Bandung is its horrible air pollution, resulting from the emmissions of unregulated motorized vehicles crowding its streets. Yet, in spite of the unbreathable air in a hot, humid climate, crowds, inefficiency, and a growing crime rate, Bandung functions remarkably well. People appear to be well fed, happy, and gracious in a way rarely seen in large American cities. Life continues to flow in a distinctively peaceful, Indonesian fashion that surprises and frustrates most Westerners. Overt hostility, aggression, and conflict are rarely, if ever, seen publicly, regardless of how congested the traffic, hot and humid the weather or how long the waiting lines. This ability to persevere, with patience and acceptance, would in fact emerge as a significant factor in the adjustment of families interviewed

The Families

A total of fourteen families volunteered to be interviewed. All of the children lived in two parent families and attended either one of two special schools or the early intervention program that participated in the study. The socio-economic levels of the families ranged from working poor to upper-class professionals. In four of the low-income families, members of the extended family lived in the same household. In all but one family, the father was the economic "head of household." Five mothers were employed outside the home and three of the wealthiest women worked as volunteers in agencies serving children with disabilities. It is important to note that although the group represented a range of socio-economic situations, none of the families interviewed came from the poorest segments of the society and all had received some degree of formal schooling.

The size of the families ranged from one child to six children The larger sized families had older parents., i.e. in their late forties, while the smaller families were typically younger, reflecting the success of the Indonesian family planning program.

Formal Professional and Organizational Supports

The Indonesia government has been identified as providing some of the best services for children with disabilities in South East Asia. However, they just scratch the surface of the needs that exists (Bhakti Mitra Utama Foundation, 1989; Indonesia/SUNY Educational Development Programs, 1988). It is important to remember,

however, that special education services are developing at the same rate as regular education in Indonesia. Children identified as having "mental handicaps" are generally not enrolled in regular primary or secondary schools. Both parents and teachers accept the premise that such children cannot be educated in these settings. This belief reflects the reality of public education which rests on the definition of education and schooling that exists in Indonesia.

Typical public school classrooms have forty to fifty children with one teacher. The teaching-learning interaction is controlled entirely by the teacher, with children seen as passive recipients of information. They pass on to the next grade through examinations used to demonstrate mastery of the uniform national curriculum, developed by the Ministry of Education. Failure requires repeating the same curriculum. Adaptations are not made for individual needs. Because of these realities, the "mainstreaming" or "inclusion" of children was not seen as desirable by the parents interviewed. They all believed their children's special education programs to be the only educational option available. The children in this study attended either one of two special schools for children identified as "mentally handicapped" or participated in a program provided by an early intervention center.

In spite of the program planning charts that dominated their administrative offices, frequent observations of the two special education schools revealed approaches to instruction that would be considered unsystematic and poorly managed by many American special educators. In addition, the academic curriculum was one that was determined by government mandates and did not initially appear to be functionally based or matched to individually determined needs and levels of the children. And yet, most students were responsive to the instruction they received. Physically aggressive behavior between children or between teachers and children was absent, as was self-abusive behavior. Many of the children, including those with Down Syndrome, were learning to read and write. Direct instruction in self-help skills and gender-specific vocational training were also components of these programs. The interactive patterns that existed between teachers and children demonstrated positive and caring relationships Teachers used warm, positive physical assistance and praised children frequently through their smiles and words. Ignoring negative behaviors, redirection, and using humor, were the primary methods used for behavior management. As the research proceeded, it became clear that these approaches were demonstrations of objective cultural patterns manifesting subjective cultural values.

All three programs were, for the most part, perceived by parents as a source of support. However, their perceptions as to the nature and degree of support varied greatly. There was a clear distinction between the perspectives of the wealthier and more educated families and those of lower-class families. The latter were most appreciative of what the schools were doing for their children and believed that they were quite fortunate to be receiving any form of educational services. Because of their inability to pay for their child's transportation to and from school, four of these mothers accompanied their child to school each day. This provided a good deal of unanticipated emotional support as well as an opportunity to observe teaching practices that could be used at home. These mothers' sense of worth and competence also increased as they provided assistance to teachers. Occasional meetings with other parents, while waiting for their children, provided additional support. This support was serendipitous, however, as it did not fall within the definitions of formal schooling.

Visiting parents have also benefited by becoming familiar enough with teachers to break through some of the social class barriers that exist between teachers and parents. Under normal circumstances, the teacher would have been perceived as unapproachable by lower-class parents. Upper-class, affluent parents holding higher social standing than teachers, only occasionally sought information from teachers. Because of the highly stratified social system that characterizes their society, parents similarly do not see other parents who might come from a different social class as a potential source of support, nor have schools developed formalized parent support groups.

The notion of developing a structure for psychosocial supports within schools did not fit the definitions of formal schooling that exist in Indonesia. Programs for parents included speakers who offered lectures for parents about handicapping conditions, educational programming and medical treatment. Such formal lectures fit the conception of what is appropriate form. However, because the informational meetings were held at night, at the schools, they were generally attended only by the wealthier and more educated parents who had easy access to transportation. In spite of this, affluent parents vocalized the greatest dissatisfaction with current school programs. Many had traveled widely and knew that there were more sophisticated and intensive approaches to treatment then those available in Bandung. The knowledge that there might be more that could be done for their child increased their level of stress. Such frustrations mobilized many of the more affluent parents toward developing and supporting the foundations which oper-

ate these schools through their financial contributions and volunteer work.

The health care system was frequently cited by all parents as a source of both support and stress. Indonesia has developed an extensive public health network with over 5,600 Public Health Centers throughout the islands, 80% of which are headed by physicians (Indonesian Dept. of Information, Rebuplic of Indonesia, 1988). These centers provide free, general health care services for families, including preventive inoculations, family planning and health information. All the families reported using either public health care facilities or private physicians as a source of information and support for their child. However, none felt that the information they received from health care professionals regarding their child's handicapping condition adequately prepared them for managing their child's needs.

Health care professionals were not perceived by parents as providing assistance in coping with the emotional impact of the child's disability. Frequently, information had been given in ways that could not be integrated by families because of their life style and/or prior knowledge. For example, none of the parents of children with Down Syndrome understood that their child's condition was a manifestation of a genetic condition that is seen throughout the world. Several expressed the belief that their child's problem was related to the underdeveloped status of their country. They believed if they lived in a more "modern" and Western country, they would have been able to either prevent or cure their child. Parents who reported seeing developmental psychologists at university clinics in Bandung, were somewhat better informed than those whose information came primarily from medical practitioners.

Rarely did parents seek out more information from the doctor than was given. The relationship that exists between doctor and patient among these families is guided by the status of doctor and patient, reinforced by both professional and cultural socialization. In combination with socially permitted forms of seeking information, status considerations reinforced parents' outward acceptance of the information they were given while not alleviating the stress they experienced. However, the belief in passivity as the appropriate role for parents when dealing with professionals had some positive aspects. Through their faith in doctors and obedience to others in authority, parents with limited formal education and who might have been unable to comprehend complex medical procedures, followed medical advice regarding medications or surgery that may have saved or prolonged their child's life, improved the child's functioning and/or prevented further impairment. The Indonesian philosophy of accepting reality with patience, a belief in the wisdom of the order of things as presented by individuals in positions of authority, supported parents' belief in physicians as healers. It was parents' belief systems rather then the physician's behavior that provided this emotional support.

Parents' belief systems included a belief in magic that holds the promise that some day the child will be cured. The bellef in the curing power of doctors, follows from a tradition that relies on spiritual and mystical traditions that run counter to Western medical practice. Every parent interviewed, including those that were themselves physicians or married to physicians, had consulted "spirit doctors" or "dukuns" at one point in the care and treatment of their child. While most said they did not believe that these "traditional" doctors would cure their child, they felt obligated to try "traditional" cures at least once. Although the physicians who visited dukuns may have embraced the rationalist beliefs of Western science, medicine and technology in their professional practice, they too had not rejected the spiritual and emotional aspects of healing in their personal lives.

The dukun was able to address a family's need for spiritual and emotional support, based on an understanding of the mystical beliefs that surround the Indonesian definition of illness and disability. This includes a belief that spirits have invaded the child's body. Although only a few parents spoke openly of these beliefs, more extensive investigations of Javanese religion (Geertz, 1960) have repeatedly demonstrated their importance in the life of even highly educated Indonesians. Although required by law and institutionalized into all aspects of Indonesian life, formalized forms of religious worship did not always match parents' belief systems. In the case of adjusting to the difficulties presented by having a disabled child in the family, indigenous religious and spiritual beliefs and values were the more consistent source of support to all the families interviewed than were either institutionalized forms of religion, health care or education.

Dukuns were recognized as an important component of health care in Indonesia and many European trained Indonesian physicians saw the dukun as a source of emotional support for families. Others saw the reliance on dukuns as problematic, particularly when it delayed parents in seeking out needed medical treatment or preventive, early interventions. In spite of their recognition of the use of dukuns, most physicians and health care providers have not openly incorporated the spiritual beliefs and emotional needs of families into the treat-

ments they offer. Their practices rest solely on Western and largely European medical training. Consequently, these professionals were not seen as a source of emotional support by families in the same way as were the "traditional " doctors.

Spiritual and emotional support came also from a blending of Indonesian and Islamic beliefs that teaches patience ("sabar") and an acceptance of reality ("menerimah"). A Moslem "Hadji" or holy man, explained that the beliefs that support these parents are an Indonesian form of the Islamic principle of "taqwa." This requires the acceptance that one's life condition on earth has been sent from God as a test of one's faith. True devotion requires both action to improve the condition within the framework of the laws of God and patience, while working towards this end. However, he believes that what often occurs, particularly among the poor, is an acceptance of one's fate without action. This may occur because of feelings of powerlessness and inadequacy, such as are often experienced by families with disabled children.

Informal Support Systems

The families interviewed relied more on informal support networks, spiritual beliefs and their extended families for emotional support than on the formal, institutionalized networks of health care, education, or religion. These supports came in the form of physical, spiritual, and psychological assistance from family, friends and colleagues at work and in their communities. Same-sex friendships were frequently mentioned as significant sources of support. For most working-class men, close friendships developed at work. For lower and working-class women whose work was primarily centered at home, support came from friends in the immediate neighborhood. Several mothers felt that as far as talking about their disabled child was concerned, only another mother in the same situation could truly empathize with their situation. In general, lower and working class families spoke of the informal support networks associated with their neighborhood community than did families from upper-classes, who were more connected with supports through formal organizations, professionals, and extended family.

The neighborhood community, or "kampung," lies somewhere between a formal and informal support system. In Bandung, working-class neighborhoods are organized like small villages with a leader elected by the community; men, women, and youth organizations; community self-help activities; a central square or play area belonging to the community that is used for structured and unstructured community activities. Doors were always left open to neighbors and their children, with children of all ages playing freely in and outdoors, watched over by older siblings, parents, neighbors, and friends.

The ability of the child and family to participate in neighborhood activities was often mentioned as important . This included the involvement of parents in community activities such as political events, sports, and festivals. However, if the child's behavior was bizarre or aggressive, parents would not include themselves and their child in community activities. The concern for appearances and the fear that others might see the child as possessed by an evil spirit kept some families isolated in their communities and removed from an important source of social support.

The free movement of children within the kampung was both a source of support and stress for the families interviewed. If the child was relatively high functioning and able to care for him or herself, the neighborhood provided a source of social stimulation that was absent in the school setting that provided few typical peers as models. It also gave parents evidence that their children would be able to care for themselves in the future. Other children were never reported as cruel or teasing of the child with a disability. However, in the case of children with limited cognitive skills, parents feared for their child's safety and were reluctant to allow their child the personal freedom that is accepted for normally developing children in Bandung.

Strong attachments typify relationships between children and parents in Indonesia. Babies may be carried on their mother's hip, in a sling, for as long as two and three years. Among upper class families, servants become the strong attachment figure for infants and young children and assume prominence in the care of children with disabilities. Corporal punishment is rarely, if ever, used to control or discipline children. Instead, control is established through threats of outsiders, witches, or evil spirits whisking the child away if they stray too far from home or disobey adults (Geertz, 1961). Such approaches to child rearing created special problems for the parents interviewed. Traditional parental behaviors built around the importance of producing harmony and reducing stress in the rearing of normally developing children were often found to be ineffective. The need to keep harmony and a resistance towards actively imposing one's will on another also kept parents from placing strict limits on their disabled child. The anger that some of the children expressed when coerced, similarly led parents to discontinue behavior modification programs that were

suggested by Western experts. Such overt expressions of anger are not acceptable and further violate the sense of harmony that is basic to Indonesian values.

The most effective strategies used by both parents and teachers to manage the children's behavior and teach appropriate social skills relied on positive reinforcement, consistent modeling, ignoring inappropriate behavior, unconditional love, and the use of humor and music. The approaches are consistent with and reinforcing of cultural norms of behavior for both adults and children.

Kinship Networks

The extended family was the primary source of support among all the families interviewed. However, the degree of support provided by kinship networks is changing as Indonesian society is becoming more Westernized. That change was reflected in the families interviewed by their proximity to extended family, the nature and degree of support provided, and the expectations families expressed regarding the care of their child in the future. Although most families had kin close enough to offer physical and emotional support many talked about the financial hardships imposed by staying in this one region of the country.

Approximately half of the families interviewed reported that members of their extended family currently, or at one time, have lived in their household. This was never expressed as a source of stress, even in homes that had little physical space. The only conflict within families that was expressed concerned cross generation differences towards the use of "traditional" treatments for the disabled child. Several young parents voiced their rejection of the power of traditional medicine or spirit cures. In spite of their professed rejection of the these treatments, they had involved their children in these "cures" out of respect for the wishes of their elders. These young parents believed that modern medicine and education could "cure" their child, but valued the support that the faith of the older generation provided.

Relationships between siblings were also very important. Although the care of children is considered to be the primary responsibility of women, young girls and boys shared in the responsibility of caring for their younger siblings. This was even true, although to a lesser extent, in upper class families, where servants were responsible for child care. It was quite common to see a child of five or six, carrying a small baby in a sling on his or her hip. When the child with a handicapping condition was an older sibling, normal sibling relationships were disturbed and were a source of stress for both parents and other children. Similarly, caring for a younger sibling with a handicap presented unique problems for the older sibling.

Regardless of these difficulties, the close relationship between siblings was viewed by parents as a source of support in the care of the child with special needs. All siblings looked after one another at home and in the neighborhood and were a source of social, language, and cognitive stimulation for each other. Acceptance of the disabled child by siblings, as well as other members of the family, is a given. Although there is the expectation is that siblings will look after each other, the majority of parents did not want the less able child to be a life long burden on his or her siblings. The smaller size of newer families has impacted on this expectation, with less brothers and sisters available to care for one another. Every parent expressed a wish that the child with the handicapping condition would be able to take care of him/herself in the future.

Conclusion: The Development of a System of Care

The Indonesian language does not have a past or future tense. Experience is defined by what is, in the present. This world view is, however, changing with the development of the country. Although talking about the future was difficult for all the parents interviewed, they recognized that the realities their children will face in the years to come, will present different demands than what currently exist. They believed that new solutions to problems will accompany these demands.

As the families I met are exposed to modern technology and Western life styles, they have begun to question the value of traditional approaches towards caring for one another. There is a growing belief that technological solutions exist for their dilemmas in other, more developed countries. This was expressed most powerfully in the desire expressed by most families for some sort of "institution" to care for their child and their belief that a cure existed in the United States or another European country for conditions such as Down syndrome and autism. For some parents, rather than following in the syncretic tradition that blends aspects of many cultures with traditional Indonesian life, there is a growing rejection of traditional beliefs. The physician is replacing the dukun and medical treatment is becoming his or her magic.

For the majority of parents interviewed, however, support is still found in a blending of the traditional with the modern, forming a uniquely Indonesian system of care. The following statement made by the mother of a teenage boy with Down Syndrome best summarizes the nature of this system:

> My friend and my extended family always give me advice to be patient but I always pray to my God in order to have this acceptance ("menerimah") and patience ("sabar"). I always try to relieve my stress so that I can have patience ("sabar"). I always ask my friend who has a mentally handicapped child for advice, not for help but for input into my treatment of my son. Besides this, I go to a wise man and the Hadji Lili (a Moslem faith healer). Sometimes they give me a special prayer or holy water. But, my priority is the doctor -- the wise-man is in addition to medical care and giving him the best food and nutrition.

What this woman's statement and those of other Indonesian parents demonstrate is that effective support to families with disabled children involves more than providing adequate medical, educational, technological and other professionally administered rehabilitation services. It also illustrates the necessity for collaborative relationships with families and communities in the development of special education and rehabilitative services for children with disabilities. Indonesia has, in fact, been moving in the direction of providing community based rehabilitation services that incorporates many of the indigenous support systems that were identified in this study.

As developing countries learn more about the failings of over-professionalized and bureaucratized service delivery systems for children and families, they will hopefully recognize that existing social supports should be reinforced and supported rather than abandoned. However, as my colleague, Dr. Setiono points out, optimal care, education and rehabilitation also requires a modification in the Indonesian belief system to one that allows for parents to take more control in the shaping of their own destiny (Kugelmass & Setiono, 1991).

In order for the artifacts of one culture to be adopted appropriately by another, the subjective and objective aspects of both must be fully understood and respected. Even the most well intentioned international development plans have gone awry because individuals steeped in the belief of the value of their work have neither carefully examined their own assumptions nor taken the time to explore the subjective culture of those with whom they are working. Western educators, health care practitioners and human service providers can learn from the failures of agricultural experiments that have introduced efficient, mechanized practices and "improved" varieties of grain into non-industrialized cultures only to have them fail to become fully integrated into the life of the country. These projects often did not fit the life style or values of the local culture (Spicer, 1967). Other experiments have had even more tragic results, destroying or undermining systems that have served the importing cultures for centuries. Appropriate technology calls for the careful application and adaptation of what works in one society to assure its fit within the context of the other. If technology is to support rather than undermine existing social structures, educators and other service providers must develop an anthropological perspective that grows out of deep and lasting collaborative professional partnerships with individuals from within these societies.

Working in non-Western societies forces an examination of the unquestioned assumption that technology can provide the best solutions for the optimal care, treatment, and development of children. In the past, although parents were required to give permission for the institutionalization of their children, they did so at the advise of professionals. At the heart of those decisions and the ones facing parents and professionals today throughout the world, is the belief that professionals, because of their academic and technological expertise, know what's best for children. When faced with children who can not be "cured," physicians and other health care professionals often turn to even more technological answers rather than exploring other systems of support that could provide a better system of care.

The resistance to authentic parent/professional partnerships can be understood as embedded in the perceptions of social roles that are integrated into the social constructions of reality that guide behavior (Goffman, 1963; 1967) and that have shaped the culture of the institutions that have been designed to serve children with disabilities. In the case of the care and treatment of those considered to be "mentally handicapped", an "ideology of care," (Soder, 1984) has developed in Western countries that runs counter to the notion that parents knew what was best for their child and that the family was the best environment for nurturing "these" children. In the United States, during the late 19th and early 20th centuries, the institutionalization of this belief became most evident when the care of disabled children became transferred from family members and other informal support networks, to professionals and formal organizations. The development of large, state operated institu-

tions for deviant children and adults was the most dramatic manifestation of this belief.

An institutionalized "system of care" did not appear in a vacuum. It was one of many manifestations of the belief in technological and scientific solutions to social problems that continue to shape American society. Like the belief in God, the belief in science and technology represents one of the "great traditions" (Wax & Wax, 19971) of Western societies. Institutionalization, specialization and professionalization represent the "little traditions" that have served the larger ideology. Changes in the latter, such as mandating family centered treatments, developing interactive software or providing access to the Internet, does not necessarily mean that the beliefs they serve will change. Instead, new forms of service delivery, although conceived as instruments of change, may get redefined to fit existing ideologies and systems (Kugelmass, 1987).

In the United States, compliance with the letter of the laws requiring parental input has not always led to the devlopment of appropriate programs for children and their families. Choices regarding service options have been limited by social forces that are unrecognized by both parents and professionals, including a lack of understanding of the ways in which subjective cultural forces drive the objective culture of service delivery systems. Social class and cultural differences, perceived status, and the shared beliefs of both professionals and parents regarding who has power in parent/professional interactions also limit opportunities to gather valuable information about the child for the development of appropriate treatment strategies, including the application of new technologies.

The direct questioning of parents is often as inappropriate for parents in the United States as it was for those interviewed in Indonesia. Non-middle class and non-majority parents are wary of revealing values and beliefs that appear to be at odds with the dominant culture. The heterogeneity that exists in the United States as well as in countries other than our own, requires that educators and other service providers observe carefully and listen to what parents are saying. Professionals need to redefine their roles to include an anthropological perspective regardless of where they find themselves. The avoidance of the non-rational elements in both healing and caring that has continually been reinforced in Western societies rests on a belief that there are scientific and technological solutions to all human needs. These assumptions must be examined if we are to provide optimal care for children and their families both at home and abroad.

References

Bhakti Mitra Utama Foundation (1989). *The 10th anniversary of the Bakti Mitri Utama Foundation*. Bandung, Indonesia.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development *American Psychologist, 32*, 513 -531.

Dalton, B. (1988) *Indonesia handbook*. Chico, Ca. : Moon Publications.

Department of Information, Republic of Indonesia (1988). *Indonesia, 1988: An official handbook*. Department of Information, Directorate of Foreign Information Services.

Dunst, C., Trivette, C., & Deal A. (1988). *Enabling and empowering families: Principles and guidelines for practice*. Cambridge, Mass: Brookline Books.

Fewell, R. & Vadasy, P. (1986). *Families of handicapped children*. Austin Texas: Pro-Ed., Inc.

Fitch, R.M. & Webb, S.A.(1989). Cultural immersion in Indonesia through Pancasila: State ideology. *Journal of Educational Thought, 23*(1), 44-51.

Gallagher, J.J. Beckman, P. & Cross, A.H. (1983). Families of handicapped children: Sources of stress and its amelioration. *Exceptional Children, 50*, 10-19.

Garbarino, J. (1982). *Children and families in the social environment*. New York: Aldine Press.

Geertz, C. (1960). *The religion of Java*. Chicago: University of Chicago Press

Geertz, H. (1961). *The Javanese family*. New York: The Free Press of Glencoe. Inc.

Goffman, E. (1963). *Stigma: Notes on the mangement of spoiled identity*. Englewood Cliffs, N.J.: Prentice Hall.

Goffman, E. (1967). *Interaction ritual: Esays on face to face behavior*. Garden City, N.Y.: Doubleday & Co.

Indonesia/SUNY Educational Development Programs (1988). *Report by the Study team on special education teacher preparation in Indonesia*. Unpublished report, Albany, NY.

Kugelmass, J. W. (1987). *Behavior, bias, & handicaps: Labeling the emotionally disturbed child.* New Brunswick, N.J.: Transaction Press.

Kugelmass, J. & Setiono, K. (1991) Developing mutual understanding between western and non-western cultures through collaborative research. *IEEIR Interchange.* Durham, N.H.: University Of New Hampshire, World Rehabilitation Fund.

Soder, M.(, 1984). The mentally retarded: Ideologies of care and surplus population. In Barton & Tomlinson (eds.), *Special education and social interests,* London: Croom Helm.

Spicer, E.H. (1967). *Human Problems in Technological Change.* New York: John Wiley & Sons, Inc.

Stewart, E. C. & Bennet, M. J. (1991). *American cultural patterns: A cross cultural perspective.* Yarmouth, Maine: Intercultural Press, Inc.

Turnbull, A. (1983). Parent-professional interactions. In Snell (ed.), *Systematic instruction of the moderately and severely handicapped* (2nd ed.). Columbus, Ohio: Charles Merill.

Wax, M. & Wax, R. (1971). Great tradition, little tradition and formal education. In Wax, Diamond, & Gearing (eds.), *Anthropological perspectives in education.* New York: Basic Books, Inc.